

ESTABLISHED 1874

The S. OBERMAYER CO.

OFFICES AND FACTORIES

Cincinnati, Chicago, Pittsburg,
O. Ill. Pa.

MANUFACTURERS OF

“Everything You
Need in Your
Foundry”



General Catalogue No. 40



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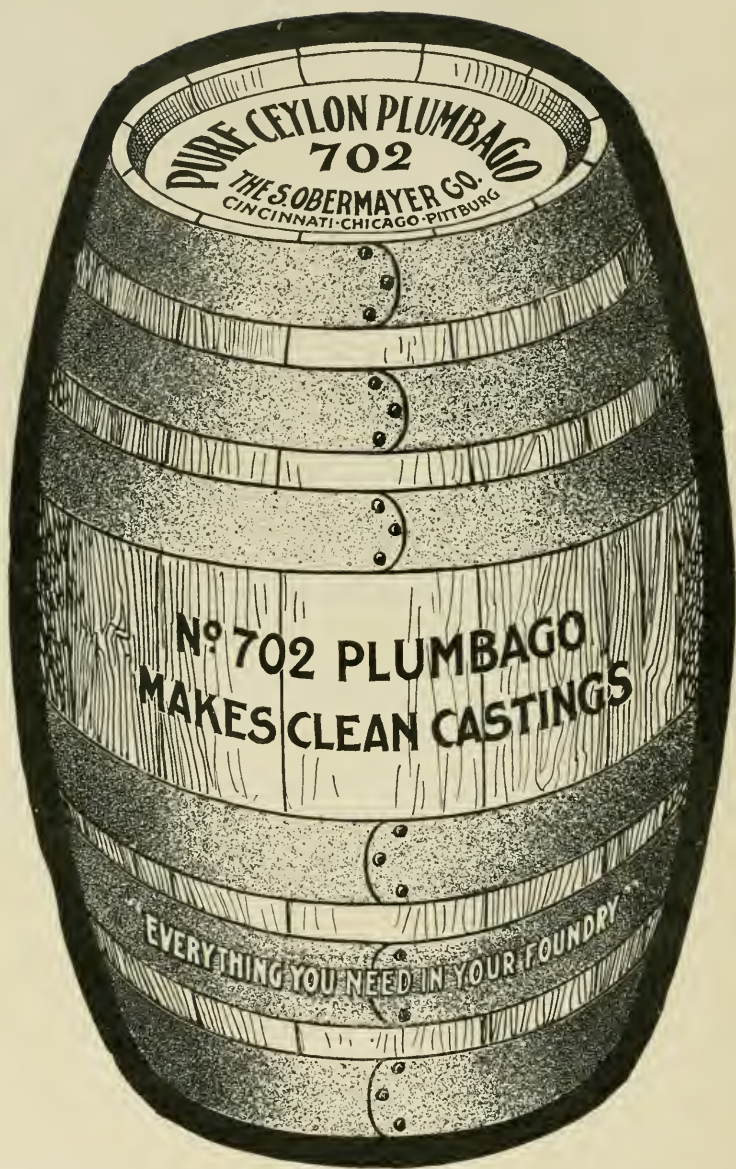
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Dealers in

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in Your Foundry"**



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of

**East India Plumbago
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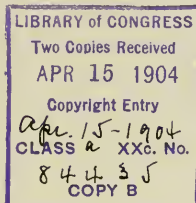
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A LITTLE HISTORY

THE development and growth of any large enterprise is always certain to contain many elements of historical value. Conspicuous among the list of enterprises, it is interesting to note how the business of this Company, which had such a small beginning, has gradually expanded, ever keeping abreast of its allied industries until it has finally reached its present proud position as the **Largest Foundry Supply House in the World.**

The S. Obermayer Co. was founded in September, 1874, by Mr. S. Obermayer, in a most modest manner, occupying a space not over twenty feet square, in a frame building on the east side of Broadway, in Cincinnati. The style of the firm was S. Obermayer & Co., and the business was principally confined to grinding coal used in mixing with molding sand. There was but one man employed, and Mr. Obermayer looked after the finances and the selling of the manufactured product.

By severe diligence, close application, economy and hard work, he accumulated enough money to permit of enlargement, and the business was moved to Gest St. and C. H. & D. Ry., where a more commodious plant was secured. Mr. Obermayer at this time associated himself with a local capitalist and they then formed a company, the name being "The S. Obermayer Foundry Supply Mfg. Co." The business continued to grow and expand, many additions were made, and the goods became known to every foundryman in the country, and were recognized as the standard in quality everywhere, while the business methods of the Company, owing to prompt attention,



MR. S. OBERMAYER.

liberal treatment and square dealing with its customers, placed it in that prominent position which it has ever since maintained. During the zenith of its prosperity, a most disastrous fire laid this large plant bare to the ground, and a new location was sought. Hardly were the ashes cold before Mr. Obermayer started to build the present plant on Evans St., South of Eighth. Rare judgment was used in selecting the site, over six acres being secured with the best railroad facilities. In less than six months a new factory, with six times the capacity of the plant recently destroyed, was in full operation.

In 1887 an immense seven story warehouse was erected, being the largest of its kind in this city. This warehouse has a storage capacity of 20,000 barrels of Foundry Facings. The Company was re-organized in 1891 with an increase of two and one half times its original capital stock and its style changed to the present title.



CINCINNATI PLANT

At this time Mr. Obermayer, looking forward to the future, and having in mind the further developments and welfare of the business, bought four acres of ground in the city of Chicago, erecting the largest and most



CHICAGO PLANT

modern plant of its kind in the world. This plant is 400 ft. long by 100 ft. wide. In this factory was installed the most modern machinery for grinding and refining Plumbago and Facings of all kinds, and since then many additions and improvements have been made.

The factory is so situated between the Penna. R. R. and the C. B. & Q. Ry., with railway sidings from each, that all incoming and outgoing material is handled at its doors.

In 1893 the mill at Larimer, Pa., was built for the manufacture of Sea Coal or Bituminous Facing. This plant is situated at the tipple of the celebrated Westmoreland Mines, where the best coal for gas and



CHICAGO OFFICE

his entire interests in charge of those whom he had trained, for many years, in the business. His diligence and thorough knowledge of the foundry supply business and the knack he had of imparting this knowledge to those associated with him, left its strong impress, so that even after his death the business



LARIMER PLANT



GENERAL OFFICES CINCINNATI PLANT

Facing purposes is procured. Within the past few years, the mill has been increased so that its present capacity for manufacturing Sea Coal Facing is over 150 tons per day.

In September, 1898, Mr. S. Obermayer passed away, leaving

continued to grow with unbounded success. In the manufacture of Foundry Facings Mr. Obermayer had no peer. He knew how to manufacture the *best*, and he knew how to sell his product. In addition to his superior business qualifications he possessed those sterling personal characteristics which en-

deared him to all with whom he came in contact, so that "None knew him but to love him."

In 1900 a warehouse was opened in the city of Pittsburg, to supply the trade in that section with all the articles of our manufacture. Offices have also been established in all the larger cities in the Union, as well as in all the commercial centers of Europe. Obermayer's goods are known in all civilized countries of the world where iron or brass are melted. Through honorable dealings and fair methods, and by manufacturing the *best and most reliable goods*, the S. Obermayer Co. has grown

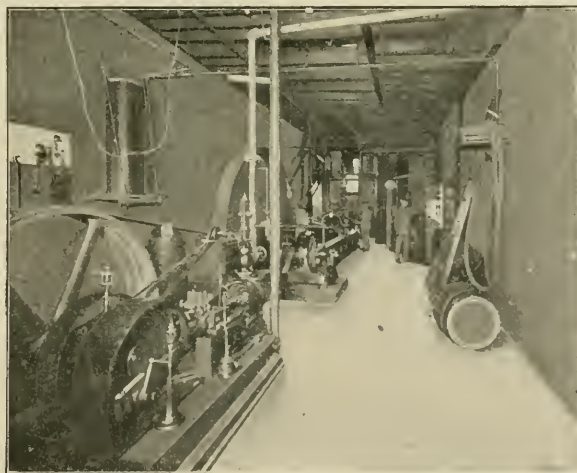


PITTSBURG OFFICE AND WAREHOUSE

from an humble beginning to its present supremacy, and is recognized as the largest of its kind in the world.

A practical idea of its volume of business during the year 1902 may be obtained from the following actual figures which are taken from our records:

Number of full carloads shipped during the year . . .	2,940
“ “ net tons “ “ “ “ . . .	52,144
“ “ pounds “ “ “ “ . . .	104,288,000



CINCINNATI ENGINE ROOM NO. 1



PREFACE



THE numerous daily inquiries for prices and estimates which we are receiving, stimulated by the general revival of the iron industry, induces us to present and prepare for our friends and patrons our entirely new and complete descriptive catalogue and price list of all articles needed in a modern Iron, Brass or Steel foundry. In compiling this catalogue our intention is to mention something regarding each and "*everything needed in your foundry.*" If we have failed in this effort, and should you require anything in the foundry not listed, please let us hear from you, as our aim is to supply you with all requirements for your foundry.

We are the largest manufacturers of foundry facings and supplies in the *world*; the largest importers and refiners of East India, Ceylon, Italian and German Graphite in the United States and therefore are in a position to fill your orders promptly at lowest prices.

Our goods have been on the market for over thirty years. They have been so improved, lately, that they are acknowledged to be *the standard and best* by the trade in general. We use the best and highest quality of crude material in the manufacture of our facings, and for this reason they produce the *best results*. All crude material is *analyzed and tested* before it enters into the process of manufacture. We have full confidence in the facings that we ship, and our guarantee goes with them; they are to give good satisfaction or you do not have to pay for the goods.

All orders are shipped the same day they are received. Our large storage and manufacturing capacities, with the favorable locations of our different plants, make our shipping facilities beyond comparison.

Your continued patronage is the highest testimonial to the *superiority* of our *manufactures* and to our *commercial integrity and promptness*. We shall continue in our endeavors to render satisfaction. We will maintain our reputation by selling and guaranteeing *the best materials for the least money, and desire the trade to know we will not be undersold by anyone.*

We keep in our employ practical molders who are thoroughly acquainted with the methods of manufacturing products from metals in all their diversity, whether steel, stove plate, green or dry sand castings,

brass, bronze or aluminum. Our facilities for handling and manufacturing are "up to date." Our superior machinery is especially adapted to the facing and blacking business, and the fact that we *know our business* warrants us to guarantee the quality of our goods, which have no superiors, and certainly no equals.

We take this occasion to thank our friends, customers and patrons for their liberal patronage during the past thirty years, and we hope the quality of our goods will merit a continuance of your esteemed favors.

We are Respectfully yours,

The S. Obermayer Co.



Factories, Offices and Distributing Warehouses:

Cincinnati, O., 641-657 Evans Street,
Chicago, Ill., Eighteenth & Rockwell Streets,
Larimer, Pa., (Westmoreland Co.)
Pittsburg, Pa., 35th & Charlotte Sts.

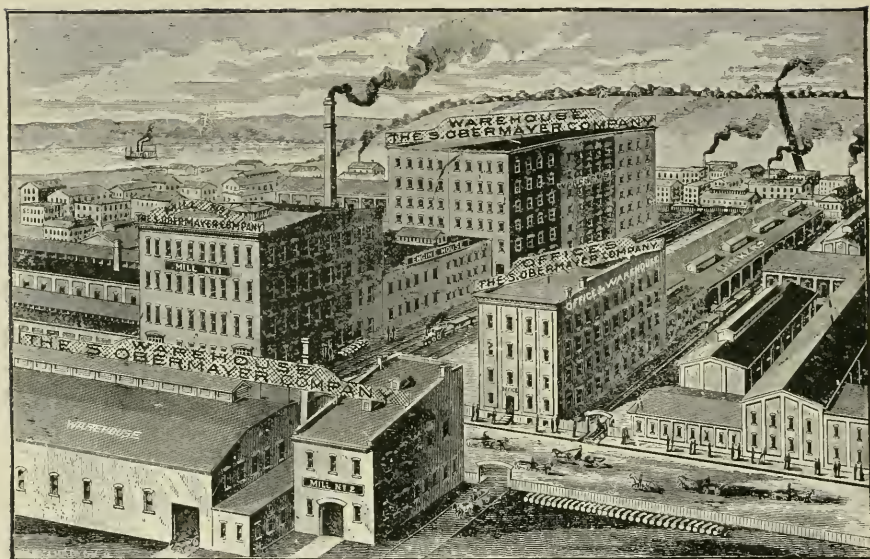
BRANCH OFFICES:

St. Louis, Mo., Roe Building.
 Denver, Colo., Cooper Building.
 Detroit, Mich., Majestic Building.
 Philadelphia, Pa., Land Title Building.
 Milwaukee, Wis., Majestic Building.
 San Francisco, Cal., 157 Montgomery St.

FOREIGN OFFICES:

Paris, London, Hamburg.

CINCINNATI PLANT



The Largest Foundry Facing Factory in the World

This Factory Covers Over Six Acres of Ground
It is Situated on Evans Street, South of Eighth Street

WE occupy 55,570 square feet of real estate, and use 90,000 square feet of floor space.

Our railroad facilities are unsurpassed; our private switch permits tracks through our entire plant, so that cars can be loaded or unloaded at our doors.

We have, besides the Manufacturing Department, a warehouse building *seven* stories high, which is 90 x 100 feet, in which to store our manufactured products, so you can readily see we are in a position to carry a large stock of goods and to fill orders the same day they are received

VISITORS ALWAYS WELCOME.

To visit our plant, take any Eighth street car going west.

Long Distance Telephones, West 873 and West 1507

Direct Telegraph Connections to the Offices

CHICAGO PLANT



THE most modern factory for manufacturing Foundry Facings and Blackings in America. It covers over four acres of ground. We occupy 40,000 square feet of real estate, and use 65,000 square feet of floor space. It is situated on Eighteenth and Rockwell streets.

How to Reach Us

You can take Metropolitan Elevated R. R. (Douglas Park car) anywhere on the Union Loop, and ride to Western Avenue; then walk two blocks north.

Our switching facilities can not be excelled. We have an Eastern Line, the Pennsylvania R. R. Co., and *two Western*, C. B. & Q. R. R. Co. switches running into our factory buildings and warehouses.

We are the only concern operating a foundry facing factory in the West.

Our Sample Rooms show everything needed in a modern foundry for either iron, steel or brass.

Visitors always welcome.

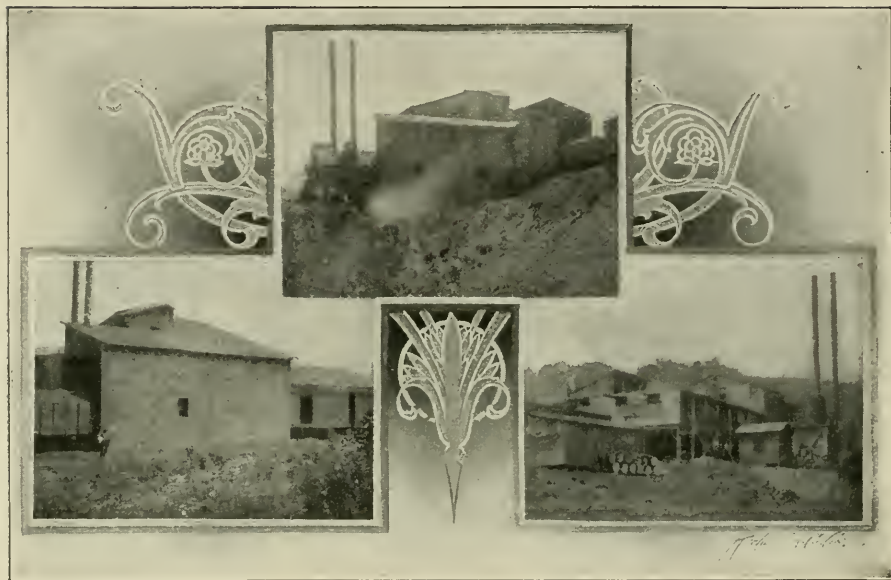
Four Long Distance Telephones

Private Switch Board

Direct Telegraph Connections to Our Offices

We have made extensive improvements in the way of new and modern machinery recently in this plant.

LARIMER PLANT



Capacity, One Hundred and Fifty Tons per Day.

Fifteen Hundred Carloads Shipped from this Plant During the Year 1902

THIS Facing Factory is situated on the main line P. R. R. 22 miles east of Pittsburg, in the Youghiogheny district at the tippel of the *Celebrated Westmoreland Coal Co. Mines*, at Larimer, Westmoreland County, Pa. This Coal is acknowledged to be the best known for foundry facing purposes. It contains *more Carbon* and *less Sulphur* than any other coal.

At our Larimer plant we have the only apparatus in this country for separating slate and other impurities from the coal.

Our shipping facilities are unsurpassed. We operate our own engines for hauling and moving cars.

Direct Telephone Connections, Irwin 61

PITTSBURG PLANT AND WAREHOUSE



THE most modern office and warehouse building in the East for handling Foundry Facings, Supplies and Equipments. This building is situated at the corner of Thirty-fifth and Charlotte Streets, alongside the tracks of the Allegheny Valley Branch, of the Penn. R. R. The plant has ample space for handling stock of EVERYTHING NEEDED in a BRASS, IRON or STEEL, FOUNDRY. Wire or telephone your orders. Should you desire to visit our plant take Butler Street or Penn. Ave. cars to Thirty-fifth Street, where we shall be pleased to welcome you.

Direct Telegraph and Telephone Connections to Offices

Direct Telephone Connections (Irwin No. 61) to our Larimer Mill

Pittsburg Office Telephones, Bell Telephone No. 24 Fisk, or Pittsburg & Allegheny Telephone No. 324 Lawrence.

LABORATORY OF THE S. OBERMAYER CO

GOOD evidence is illustrated in a corner of the laboratory of the S. Obermayer Co., not only that greater exactness is demanded by foundrymen, but that they are insisting upon certain qualities being present in the material they purchase.

The laboratory is not a deviation, as a certain journal termed it, but a necessity. Its present form is the result of improving and concentrating existing facilities in order to meet modern requirements.

The importance of a careful examination and analysis of the crude stock entering into the manufacture of foundry facings and the various commercial articles used in foundries, was early recognized by the late Mr. Obermayer, who devoted



considerable of his time to the study of chemistry, which resulted in the production of several facings now extensively used. For the last fifteen years the chemical work of the S. Obermayer Co. has been in charge of Mr. Herman Mende, who is a graduate of the University of Jena, Germany, where he was assistant at the mineralogical and geological museum.

The principal work at the Obermayer Company's laboratory is of an analytical nature, which consists of examining the crude material, such as graphite, coke, bituminous facing, clay, charcoal, anthracite, sand, flour, rosin and other material which enters the foundry in various forms of manufactured articles.

Experiments on a scientific basis are continually being made to improve present products and invent new ones, besides a helping hand is extended to customers if they should desire a chemist's assistance.

The laboratory includes the latest and best instruments for the determination of graphite and carbon in various states. Half-shade polariscope for examination of other substances; Microscope with latest features and attachments; Mohr's balances for determining specific gravity, not to mention other instruments which are necessary to a well equipped laboratory.



TO THE TRADE



WE present to you what we term our "Combined Equipment and General Foundry Supply Catalogue No. 40," in which we desire to give you an idea of the latest improvements and labor saving devices connected with a modern and *up-to-date* foundry. We desire to call to your attention the fact that we can figure with you on "**everything needed in a brass, iron or steel foundry.**"

WE HAVE IN OUR EMPLOY FOUNDRY EQUIPMENT EXPERTS

Who have entire charge of this special department, and they devote their entire time to all correspondence which relates to Cupolas, Cranes, Ladles, Tumbling Mills, etc., etc.

We desire to advise our customers and friends that we are in a position to furnish you with *Foundry Plans and Ideas of the latest and most improved designs.*

We can furnish your foundry complete in all details, also supplying you, when necessary, with *the plans for the building or for the placing of the equipment*, so that it will not only be a *source of economy*, but *more convenient* in every way.

With the list of goods mentioned, together with our equipment department, we can furnish you with "all and everything needed in your foundry."

Write us for special circulars. Advise us if you are experiencing any trouble in the foundry—we will try to help you. We invite correspondence. All letters will have our prompt and personal attention.

We desire foundrymen to advise us if they have any new ideas, plans or improvements for foundry work, which we can place upon the market to the greatest advantage of all interested parties.

We have been manufacturing Foundry Facings and Supplies for the past thirty years, and our goods are known as the *Best* and *Standard*. Our EQUIPMENT DEPARTMENT is not a new business with us, we having placed many of these goods on the market during our business career, but we are now in a far better position to satisfy your wants in this department than any other concern in the *world*.

In submitting figures we do not expect to be the lowest, but we will at all times guarantee our goods as represented—finished in the best possible manner—finished according to specifications furnished. The *best* material and workmanship enter into their manufacture, and they are built in a truly mechanical and practical manner. Each and every part is tested, and we know that every machine which you purchase from us will do the work in the manner intended.

We thank you for your liberal patronage, and we hope the quality of our goods and the service we have rendered you in the past will merit a continuance of your valued commands.

Yours very truly,

The S. Obermayer Co.

**The Largest and Most Reliable Foundry
Supply House in the World.
Established 1874.**

Factories: { Cincinnati, O.
Chicago, Ill.
Pittsburg, Pa.

REMEMBER

Prices subject to change without notice.

All orders and contracts subject to delays, on account of strikes, car supply and other causes beyond our control.

Prices named subject to a liberal discount.

Quotations binding only for immediate acceptance.

Cable address, "Esso," Chicago, Ill., Cincinnati, O., or Pittsburgh, Pa., U.S.A. All standard Codes used.

We have direct telegraph and telephone connections to all our offices.

TERMS: Net cash thirty days, unless by special agreement or contract otherwise specified.



Special Catalogues

WE issue Special Catalogues and Circulars on the following and we would suggest that you write for any in which you are interested. In these catalogues we give you more general and detailed information:

Molders' Tools	Illustrated, with prices		
Wheelbarrows	Iron, Steel and Wood for all uses		
Brass and Aluminum Supplies . .	Illustrated with prices		
Core Machines	"	"	"
Sand Sifting Machines	"	"	"
Tumbling and Cleaning Mills . .	"	"	"
Molders' Brushes	"	"	"
Cupolas	"	"	Capacities, etc
Ladles	"	"	Prices and Descriptions
Core Ovens and Core Oven Fittings	"	"	Descriptions
Pneumatic Tools	"	"	Prices and Descriptions
Foundry Elevators	"	"	" "
Cranes	"	"	Descriptions
Air Hoists	"	"	"
Trucks, Turntables and Core			
Oven Cars	"	"	"
General Equipments	"	"	"
Foundry Facings and Blackings .			"
Obermayer Bulletin of Information	"	"	"

We issue Special Circulars and Catalogues from time to time and we will be pleased to put your name on our mailing list. Send in your name and address.

SPECIAL ATTENTION

If we please you, tell others;
If we don't, tell us.

WE shall consider ourselves indebted to those who may inform us of any just complaint which they may have regarding our manufactured products. We will thank them to call our attention to any faults or shortcomings, and we assure manufacturers and the trade that we shall investigate such matters promptly, also take special pains to rectify any wrong. "To err is human," therefore we hope you will never hesitate to advise us. We desire your trade and our object is to furnish you with perfect goods and entire satisfaction.

Conditions and Terms of Sales.

PRICES mentioned are subject to a liberal discount, varying with the fluctuations of the market, and they are binding only at the time given. *No quotations given by our salesmen are binding on us, unless the order is given to them at the time.* Prices subject to change without notice.

We necessarily send our catalogue to many with whom we have not had the pleasure of an acquaintance and all persons ordering goods from us for the first time should accompany their orders with cash or satisfactory references, unless satisfactory financial rating is shown in the Commercial Agencies. For the same reason as the foregoing we must decline to ship goods C. O. D. to strangers, unless they comply with the above request, because of the weight and bulk which would entail unnecessary additional expense in case of non-acceptance by the purchaser.

Special quotations furnished when desired.

Your inquiries will receive prompt, careful and thorough attention.

We pack carefully and ship in merchantable condition, and our responsibility ceases with such delivery at shipping point. Claims for missing packages, overcharges or unusual breakage should be made on the Transportation Companies.

We contract through freight rates on lots of over 200 pounds at lowest figures to all points.

Our shipping facilities are unexcelled, shipping goods from our Cincinnati plant to the North, South and the Middle West; shipping to the West and Northwest from our Chicago plant and shipping from our Pittsburg plant to all Eastern points.

Write for our prices.

WE TAKE THE LIBERTY OF CALLING YOUR ATTENTION TO THE FOLLOW- ING FACTS.

THAT good facings, when properly used, are a source of profit to the manufacturer and a saving of time to the molder.

That in making smooth, clean and good Castings, soft fluid iron, good sand, good molding and good facings are the elementary necessities.

That if one kind of our Facings does not suit your sand, we have others that will.

That we sell good molding sand for every description of castings.

That we have done more to assist in the saving of labor and material in the cleaning and improving the appearance of castings, and in the reduction of prices than all similar establishments in the country.

That we are well acquainted with the wants of Foundrymen, and are prepared to furnish everything in their line with promptness and dispatch.

That we meet the trade personally and thus have opportunities of deriving valuable information about their requirements in different sections.

That, being the manufacturers, we are able to offer DEALERS and HEAVY BUYERS the most flattering inducements as regards special prices.

That we contract freight by rail or water at the very lowest figures.

That foundrymen needing molders and other mechanics can have their wants supplied by us, free of charge, by informing us of the nature of the work to be done. We will always endeavor to secure skilled workmen for you.

That foundrymen in doubt as to the kind of Facings required for their work, and those desiring any information connected with the business, can obtain cheerfully what knowledge or advice we may possess, by corresponding with us. We offer our best efforts to them from our knowledge and that of experienced foundrymen in this and other cities.

FACTS WORTH KNOWING

THAT we are the largest and most reliable foundry supply house in the world.

That we are the largest importers and refiners of East India or Ceylon Plumbago, Graphite and Silver Lead.

That we employ skilled mechanics only in our establishment, among whom are molders and experts in the various branches of their trade.

That the United States Government uses our Facings exclusively, and in letting contracts specifies the quality of material wanted upon the standard of our manufactures, using our name in their specifications.

That our concern is the only establishment where you can get a complete assortment of *Brass Pattern Letters*.

That in orders placed in carload lots you will save twenty-five to fifty per cent in freights and besides we make a special discount on such quantities.

That we do not sell Facings in smaller quantities than one barrel.

We pack in tight barrels, paper lined, and make no charge for them. Special freight rates secured.

Facings and Blackings are often condemned without a fair trial. The molder should exercise patience and perseverance in applying them and judgment in pouring the metal. Don't condemn them at the first unsatisfactory trial. It is likely you have not used them properly. When you are in doubt, write to us for directions, and they will be cheerfully furnished.

That our plant at Larimer is the largest and best equipped plant of its kind for the manufacture of Sea Coal or Bituminous Facing.

That our plant at Chicago is the latest and best equipped factory for the making of all kinds of *foundry facings* in the country.

That we fill all orders for the Eastern trade from our Pittsburg warehouse.

That orders are shipped from the nearest factory to your foundry, giving you the advantage in time and freight.

That in shipments going a long distance we can save you money in freight charges by making complete shipments of Equipments, Facings and Supplies all in one car.

You receive dollar for dollar from us.

We offer you the most liberal terms.

We make prompt shipments.

Transportation Companies are responsible for the goods after our delivery, in good order, to them, but we are always willing to aid our customers in settlement of any claims for loss or damage while in transit.

Should there be any loss in transit make your claim to them.

Quotations subject to change without notice, and all contracts are contingent upon strikes, unavoidable delays and circumstances beyond our control.

A cheap thing is seldom good and a good thing is seldom cheap.

If you should desire to telegraph us use either our Telegraphic Code or A. B. C. Code.

Foundrymen or Molders desiring information should communicate direct with us.

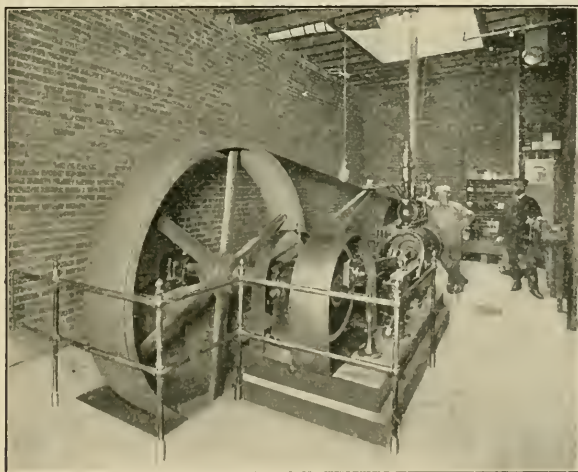
Our entire tonnage exceeds the tonnage of all others combined.

Our No. 40 catalogue is the most complete of its kind in this line of business.

Always keep all Facings in a dry place.

On your orders always designate definitely by figure or letter the article in mind, thus making known your wants, which will avoid mistakes and facilitate filling your requirements.

WE HAVE "EVERYTHING YOU NEED IN YOUR FOUNDRY"



CINCINNATI ENGINE ROOM NO. 2

FOUNDRY FACINGS AND BLACKINGS

Process of Manufacture and Quality

EVERY foundryman is interested in good Facings and Blackings, and no article in the market can we call to mind that varies so much in quality as these. Raw material of the basest impurity is sometimes utilized by unreliable manufacturers and offered at temptingly low prices and guaranteed as A No. 1. But poor facings will produce poor castings, and they are dear at any price; that is self-evident. Our goods have been pre-eminent for more than thirty years—they require no introduction. Over *six thousand foundrymen* use them daily.

Our new and improved machinery for the reduction of material into blackings grinds them into an *impalpable dust*. Blackings and facings reduced to that desirable texture should be demanded. Coarse blackings are the cause of much dissatisfaction and of considerable expense; they result in too much waste in the “shakings” that are left, which must be thrown away.

Our Facings and Blackings are ground from the purest and best selected material only, and our Bolted Facings are finer than flour. We employ a chemist who analyzes all the material we manufacture; should any fall below our approved standard of purity and excellence, it is promptly rejected. HIGH GRADE GOODS have made our reputation, and to maintain this standard is our constant endeavor.

Our *Sea Coal or Bituminous Facings* are ground from the best quality of gas coal and contain neither slate nor sulphur (these being eliminated by a process of our own invention) but are rich in Hydro-carbon gases, and are at least twenty-five per cent stronger than any other coal facings. They are ground fine and uniform, and should be mixed with the sand in proportion of one shovel of coal facing to twelve or fifteen shovelfuls of sand for medium and light castings, and of one shovel of coal facing to nine or ten of sand for heavy castings.

Such firms as are located adjacent to a railroad or have switching facilities, and who are provided with a bin or other proper receptacle, can save money by ordering these facings *in carloads in bags*. We are shipping large quantities to firms having such conveniences. Foundrymen should please bear in mind that this advantage is only vouchsafed to those who are so situated.

Something is needed that will prevent the sand of the mold from being burned by the molten metal; that will cause the casting to “peel” readily; that will permit the casting to be delivered from the

mold with a "slick," smooth surface and a bright color; and in order to do this, the facing used must be refractory; something that will neither burn or run before the molten metal at the time of pouring; it must adhere firmly to the surface of the mold, and part well, or "peel" readily from the casting; it must admit of being smoothed or "slicked" in the finishing of the mold; finally, it must give the casting a uniform bright color. Plumbago (or black lead) blacking or facing, if of good quality and properly prepared, contains the above requisites. It will do it well and cheaply, and enough of the expense of dressing castings will be saved to more than pay for the blacking.

Our Georgia or Yellow Talc

Is absolutely pure, and will not wash when used in moderate quantity. It contains no marble dust, oyster shells or other unmarketable trash to make it sell cheaply. Good for hollowware and other light castings.

Our Selected Charcoal Facing

Is ground from hard and heavy wood—no mixture of anthracite to make it weigh heavily. Good for core blacking, for returning patterns and on light work.

Our Pine Charcoal Facing

Is a splendid facing for brass and bronze work, and it is sometimes preferred as a Return facing. No other establishment but ours grinds pure white pine charcoal.

Our Coke Facing and Blacking

Is ground from the pure and genuine Connelsville Lump Coke. It is excellent for general and dry sand or loam work.

Our Rhode Island Facings

Are pure and unadulterated; they are too well known to require comment, having been used by the leading foundries for the last *thirty-five years*, and being fully up to the standard at the present time, and at greatly reduced prices, merit your consideration.

Our Peerless Heavy Machine Facing or Blacking

Is a graphitic coal; it is unequaled for all classes of work, and especially on all machine work, where fine, smooth castings are desired. We can truthfully say Peerless Facing or Blacking will satisfy you. It has a heavy Black-Lead body and is composed entirely of fire proof

ingredients, which, with their different properties, compose the very best heavy facing or blacking on the market. It will not run before the iron; it can be "slicked" without adhering to the trowel, and it will make the *smoothest, brightest and best colored casting* possible with the use of a facing or blacking. We heartily recommend it for all kinds of work and if not entirely satisfactory in every particular you can hold it subject to our order.

Our Peerless Stove Plate Facing

Is giving splendid satisfaction. We have introduced it in stove foundries in all parts of the country, and in all kinds of sand. Everywhere the result has been the same. A *smoother, brighter and better peeled Casting* was never obtained with any other facing. We are informed by customers that they accomplish this result with a saving of at least 25 per cent in facing.

Our Pure Mineral Facing

Is ground from pure graphitic coal. It is good for the heaviest and lightest work. Do not confound it with the XX Mineral Facing.

Our "Blackstone" Heavy Machine Facing and Blacking

Is used, not only for the heaviest class of work but also for the lightest. On the latter it need not be slicked; on the former it may also be rubbed into or brushed on the mold with the hand, or with a camels hair brush. This Facing and Blacking is extensively used on furnace and rolling-mill work. *The United States Government uses it in its arsenals and workshops*, and it is used by all the railroad foundries in the country. This is a good Blacking for loam and dry sand work. It is also very good as a heavy stove plate facing.

Our Garland Stove Plate Facing

Is a fireproof and a magnificent facing. It will *not* stick, wash or cut under the gate, and it peels easily.

Our German Crucible Clay

Is used as a foundation facing in the place of lime or cement, in a great number of the largest and best stove foundries in the United States. It assists in making very smooth castings.

Our Reliance Facing

Is an excellent facing for general work, including sinks, car-wheels, etc.

Our "H. B. B." and "F & C." Blackings

Are intended for heavy work and for loam and dry sand castings.

Our Founders' Peerless Perfect Wash

Is used on very particular cores and on heavy castings that are designed to be extra smooth; also on brass, dry sand work and especially on cylinders.

Our Esso Plumbago Core Wash

Is splendid for large or small cores.

Our XX Mineral

Is good on car wheels, for light and medium weight work. When Blackings are "sticky" or curl under or follow the trowel, let the molder dust a little charcoal over them very lightly; or, if more convenient, he can mix a little common low grade flour into the bag with the blacking before dusting on the mold. He will thus be enabled to slick it more readily or to return the pattern without fear of the mold adhering to it.

Our American Graphite,

Which we placed on the market ten years ago, has deservedly attained great favor as a general utility Blacking for all purposes, and where work is not so particular it is giving good satisfaction at a lower cost than either Silver or German Lead. It is a pure Plumbago, works free and easy, and it will stand the iron without cutting or washing, which produces good, clean castings. By examining the samples and trying them on the sand, by the side of other facings, you will find it a most economical facing to use, owing to its fineness and heavy body. We have modified it, making four adaptations. The "sticky" we denominate No. 1; that which "slicks" best and is the least "sticky," we denominate No. 4. Of course Nos. 2 and 3 are between the two extremes.

Our North Carolina Talc

Is not recommended as a facing, but as a lubricator. It is of pure white color, and the finest grade is called French Chalk, for leather finders, druggists, kid glove dealers, etc.

Our Brilliant Facings,

Of which there are three grades, whose refractory powers are modified in accordance with the nature of the castings desired, were *in-*

vented and *patented* by our Mr. Obermayer while experimenting with various chemicals which he used in blacking molds for steel castings.

Brilliant No. 1

Will withstand a *white heat* without running before the metal. It forms a surface which resists the heat like a Salamander, the result being a clean scale when the casting becomes cold. It is a splendid blacking and dusting facing for general work. It can easily be "slicked," does not wash, and peels readily when the casting becomes cold. It is excellent for blacking rolls and other heavy work.

Brilliant No. 2

Is the best stove plate facing ever invented. Many stove manufacturers use no Return or Charcoal facing with it, but return pattern directly upon it. It leaves a beautiful color and finish on the casting; it does not wash or run before the iron; does not burn under the gate or sprue, and peels the sand readily, also permits the castings to grow cold quickly. For extra fine work you should dust our Return Facings very lightly over this facing. We recommend it heartily to Stove Manufacturers.

Brilliant No. 3

Is a splendid facing for medium or light work, and it answers well as a stove plate facing.

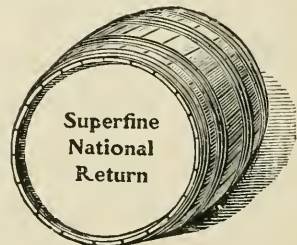
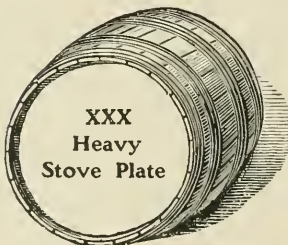
Our Steel Casting Wash

Is one of Mr. Obermayer's discoveries. It is, as its name implies, a perfectly indestructible blacking for steel castings and for steel converters.

Our Silica Wash

For steel castings, is absolutely pure. It is the very best on the market and is used in almost all the steel foundries in the United States.

No charge for Trial Samples of any kind.



TO THE MANUFACTURERS OF STOVE PLATE CASTINGS

Our Stove Plate Facings have been on the market for the past *thirty years*, and they have proven themselves all that we claimed for them, that is the VERY BEST. Every Stove Molder in the country is familiar with our brands of STOVE PLATE FACINGS, and he knows how to use them to the best advantage.

Our Stove Plate Facings are finely ground so there are no shakings, all the Facing passing through the Dust Bags. In order to make perfect Stove Plate Castings, two Facings are essential, a *top* or *Heavy* Facing dusted on the mold to cover the pores of the Sand, a *light* or *Return* Facing dusted on the top or Heavy Facing to prevent the pattern from "Sticking" when the pattern is "returned or printed back."

In ordering Stove Plate Facing state whether your Sand is "Open" or "Close."

We give you below the names of our well known brands of Stove Plate Facings.

TOP OR HEAVY FACINGS

XXX Heavy Stove Plate Facing
Brilliant Stove Plate Facing
Esso Stove Plate Facing
India Silver Lead Facing
Fire Proof Facing

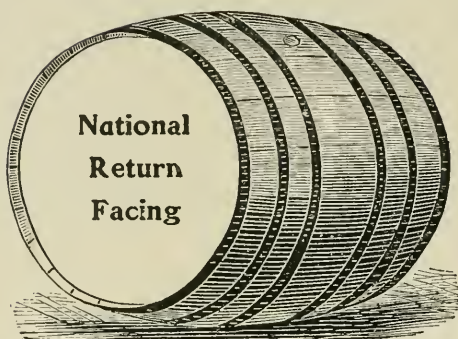
LIGHT OR RETURN FACINGS

National Return Facing
Eagle Return Facing
Peerless Return Facing
Prepared Charcoal Facing
White Pine Charcoal Facing

In conjunction with the above Facings BOLTED CEMENT is dusted on near the sprue or gate of the mold. This will prevent the iron from "*Washing*" at that point.

Our Stove Plate Facings have been endorsed at various meetings of the National Stove Manufacturers' Associations as the Standard of Quality.

**If You Want Good Clean Stove Plate Castings Use "Obermayer's"
Stove Plate Facings**

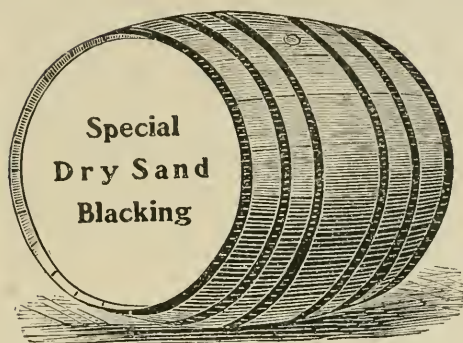


NATIONAL RETURN OR LIGHT FACING

For Stove Plate and Light Castings

IN this branch of the Facing business we pride ourselves on making the finest and most complete line manufactured. When castings are wanted particularly smooth, bright, and of a uniform color, it is necessary to return the pattern. Our Return Facings will not stick to the pattern, while they aid the first or heavy Facing. The particular benefit derived from their use is in making a bright, smooth casting, of uniform color, true to the pattern. This can not be obtained by the use of Charcoal. We have RETURN Facings for all classes of work and all kinds of sand. When the Heavy or First Facing is put on the mold it should be allowed to settle before the Return Facing is shaken over it. With the use of our Return Facings a quick return of the pattern is not as necessary as it is with the use of Charcoal Facing. Return Facings must be kept in a dry place as they absorb moisture very rapidly. We make Facings for both open and close sand, therefore it is always best to let us know what kind of sand you use. The very best results are obtained by following these directions. If your sand is poor use our German Crucible Clay as a foundation Facing. The moisture which this Facing absorbs from the surface of the sand, and the heat of the iron, forms a crust which readily scales from the casting, and our National Return Facing is found to be the best for this purpose.

Use **XXX Heavy Stove Plate** with above to secure good castings.



DRY AND LOAM SAND BLACKING

IT is necessary, very often, for foundrymen to make castings in Dry or Loam Sand, and to secure the best results the item of a good, *first-class Blacking* should be given serious consideration.

For the above classes of work we recommend a Blacking that will withstand or resist the action of the hot iron when it is poured, which will permit the casting when it is taken from the sand to peel readily and retain a good blue color. To secure these results for a foundryman the manufacturers must understand the quality of material which is suitable for this class of work. We have made a particular study and have given careful attention to castings which have been made in Dry and Loam Sand, and we are in a position to furnish the right kind of Blacking. We have prepared a **SPECIAL DRY SAND BLACKING**, which takes in consideration all the vital parts with which one has to contend in this class of work, and it is known as our **SPECIAL DRY SAND BLACKING**, which we guarantee to give full and entire satisfaction.

When you are interested, write us and we shall be pleased to submit samples and prices.

This **DRY SAND BLACKING** is the best and most successful material which has ever been placed on the market. It's *not cheap* but *it's good*.

Obermayer's Blacking Swab is used successfully for distributing this blacking on the mold.

Use **No. 702 Ceylon Plumbago** on Green Sand work, especially where **Heavy Machine Castings** with *smooth surface* is desired.

CLASSIFICATION AND USES OF FACINGS AND BLACKINGS

TO enable foundrymen at a glance to select the brands of Facings or Blackings suitable for the size, nature and quality of castings which they may desire to make, we classify them as follows:

For Cast Iron, Gas, and Water Pipe:

Best Coke, Lehigh, Reliance and Charcoal.

For Lightest Machine, Brass Castings and Hollow-ware:

Talc, Soapstone or Charcoal, Pure Peerless Plumbago.

For Cores:

Charcoal, Coke, Blackstone, Anthracite, Plumbago or Graphite, Peerless Perfect Wash and Esso Plumbago Core Wash.

For Agricultural Implements and Medium Weight Castings:

Brilliant No. 3 Plumbago, Reliance, Blackstone, Pure Mineral, XX Mineral and Peerless Plumbago.

For Heavy Machinery, Rolling Mills, Car Wheels, Ingots, Blast Furnaces, Etc.:

Founders' Perfect Wash, Brilliant No. 1, "H. B. B." and "F. & C." Plumbago, Blackstone, Peerless Perfect Wash, Esso Plumbago Core Wash and American Graphite.

For Car Wheels:

XX Mineral, Reliance, Blackstone and Special Car Wheel Facing.

For Loam and Dry Sand Work:

Reliance Blacking, Peerless Perfect Wash, Esso Plumbago Core Wash, Pure Ceylon Plumbago and Special Dry Sand Blacking.

For Steel Castings and Steel Converters:

Brilliant No. 1, our Special Steel Casting Wash and Silica Wash.

For Brass Castings:

Charcoal, Carbon, East India Silver Lead or Ceylon Plumbago and Georgia Talc.

For Stove Plate or Piano Castings, Light and Heavy Facings are Used as Follows:

First or Heavy

Brilliant No. 2 Plumbago.
Blackstone Heavy Machine.
XXX Heavy Stove Plate.
Garland Stove Plate.
American Graphite.
Esso Heavy Stove Plate.

Light or Top or Return

Superfine National Return.
National Return.
Eagle Return.
Phoenix or Carbonized Return.
Selected Charcoal.
Peerless Return.

In some parts of the United States either German Crucible Clay, Foundation Facing or Prepared Bolted Cement are used in addition to the Light and Heavy Facings on Stove Plate. These are dusted directly upon the Sand to fill up the pores and to draw dampness.

For Hollow-Ware Castings:

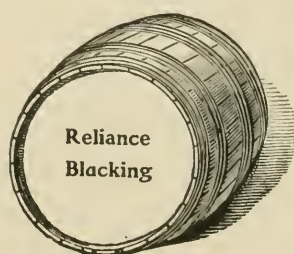
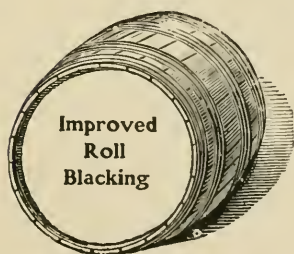
Yellow Talc, Ceylon Plumbago and sometimes extra Fine Sea Coal.

For Cannon or Cylinder Stoves and Kettles:

Our celebrated Cannon Stove Barrel Facing applied with a camel's hair brush and our Peerless Plumbago. Sometimes a mixture of Talc and fine Pure East India Plumbago. Sea Coal is also mixed with the Sand on this class of work.

Sea or Bituminous Coal Facings

Are invariably used in machine foundries in addition to the blackings. The object of their use is to assist in peeling a casting as well as to vent the mold. They are mixed in with the sand and in machine foundries extensively used mixed with the sand for making cores. Put yourself in correspondence with us regarding **Facings and Blackings.**



PRICES ON FOUNDRY FACINGS AND BLACKINGS

Founders' Perfect Wash	10	cents per lb.
Peerless " "	8	" "
Esso Plumbago Core Wash	6	" "
Brilliant No. 1 Facing, patented July 26, 1884	6½	" "
" No. 2 " " " "	4½	" "
Peerless Plumbago	3½	" "
Steel Casting Wash	5	" "
"H. B. B." Blacking	4½	" "
"F. & C." Blacking	3¾	" "
American Graphite	3	" "
Rhode Island Facing and Blacking, 1st quality	3	" "
" " " " " 2d quality	2½	" "
Reliance Facing	2½	" "
Pure Mineral Facing	3	" "
Blackstone, Heavy Machine (a Carbonized Lead)	3	" "
Providence, R. I., Heavy Machine	3	" "
Peerless, " "	3	" "
Esso, " "	3	" "
XXX Heavy Stove Plate Facing	3	" "
Peerless Stove Plate	3	" "
Brilliant " "	3	" "
Superfine National Return Facing	3	" "
Regular " " "	3	" "
Improved " " "	3	" "
" Eagle " "	3	" "
" Peerless " "	3	" "
Coke Blacking and Facing (Hand-Picked, 72-hour Connelsville)	1¾	" "
Commercial Coke "	1½	" "
Selected Charcoal "	3	" "
White Pine "	3	" "
Prepared Charcoal "	2	" "
Lehigh "	1½	" "
Anthracite "	1½	" "
XX Mineral Facing	2	" "
North Carolina Soapstone (Pure white) or Talc	1½	" "
Yellow " " "	1¼	" "
Pennsylvania " " "	1½	" "
Georgia or Cream " " "	1½	" "
Sea Coal or Bituminous Facing	\$1.00 per bbl. of 200 lbs.	
Sea " " " " in carloads. Prices on application.		
Bolted Sea Coal Facing	1	" "
German Crucible Clay	1¼	" "
Prepared Bolted Cement	1½	" "
Foundation Facing	2	" "

Sea Coal or Bituminous Facings shipped in carloads direct from nearest plant.

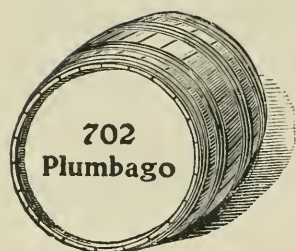
Above prices in original barrels; in less quantities, add 2 cents per lb.

For prices on Plumbago, see page 36.

A LITTLE LIGHT ON A DARK SUBJECT



“ESSO PLUMBAGO”



POINTERS ABOUT FACING AND SAND

1. The gases in molding sand pass out when iron is poured into a mold.
2. When gases pass up through the iron, it is because the sand is rammed too hard or it is not properly vented.
3. Steam accumulated under liquid iron will raise and cause blow holes.
4. Too much water used in mixing sand creates surplus steam when the metal is poured into the mold.
5. When iron bubbles or boils, the gases are passing off the wrong way.
6. Iron naturally seeks a soft bed. If poured on a hard bed it will bubble and fly.
7. If there is not a good opportunity for gas and steam to escape downwards, it is seldom that there is pressure or body of iron strong enough to keep them from passing up through the iron, and thereby causing a casting to blow or be scabbed.
8. When iron bubbles or boils in a mold, it will make a scab.
9. Too much venting will seldom do any harm, but hard ramming may cause all kinds of trouble.
10. Whenever hard ramming is required, it should be done on the outside portion of a mold.
11. Dry sand molds, as a general thing, should be rammed harder than green sand molds.
12. The rammer should never be permitted to strike a pattern when ramming up a mold.
13. The narrowest point of the mold fitted is the one which should be rammed the hardest.
14. Too much depth of sand in ramming will be apt to make swells on the side of a casting unless well gagged and strong sand is used.
15. Any bottom section of a mold that is covered rapidly with iron, so as to have a pressure upon it, will stand harder ramming than where it is to be covered over slowly.
16. Never patch a mold with a tool when you can patch it with your hand or finger.
17. The less sleeking in order to properly finish a mold, the better will be the casting.
18. A hard surface sleeked mold is apt to cause cold shut and thin scabs on a casting.

19. Never sleek the mold twice where once will do.
20. A close mixture of loam or dry sand is very liable to scab, while if it is too open, the mold will not stand the dropping or washing effect of the iron when poured.
21. If No. 702 Plumbago is used as a blacking and rubbed on with the hand, you will prevent scabbing, and the casting will be bright, smooth and peel off clean.
22. A cold shut casting is harder to deal with than a scabbed one.
23. Scabs can be chipped off, but to obviate cold shuts has puzzled many a molder.
24. Dry sand or loam molds, if not thoroughly dried, generally cause a casting to become scabbed.
25. Using the facing sand too strong causes cold shut or streaked castings.
26. Wet blackings, dry sand or loam work should be mixed with molasses water instead of clay. It should be mixed gradually leading up from paste. Add more water until proper consistency is secured.
27. A casting poured hot will finish up cleaner than one poured dull, but a casting poured with dull iron will take a greater strain or weight to break it than one poured with hot iron, but by using No. 702 Ceylon Plumbago or Esso Plumbago Core Wash you can pour the iron as hot as you desire and as soon as you tap the iron.
28. For ornamental or small brass castings, use New Process Brass Sand. If convenient put the sand through a No. 60 riddle.
29. When pouring off after night, use white Soapstone or Flour around the gates.
30. Use our XXX Heavy Stove Plate for bottom and National Return for top facing to keep the *pattern* from *sticking*. These make "up-to-date" castings and are the FINEST CASTINGS in the world.
31. If you want a good "all-round" facing for a jobbing Foundry that can be used as a heavy dust, or as a wet blacking (when mixed with molasses or clay water) use our Brilliant Facing. It makes the castings as clear as a mirror. It makes an excellent FACING for STOVE PLATE CASTINGS.
32. Always see that your gates are cut before closing your cope or clamping the flask.
33. After closing flask note carefully that same is weighted and well clamped.
34. When it is possible to make castings in green sand they are preferable to those made in loam or dry sand.

PLUMBAGO, BLACK LEAD, OR GRAPHITE

THESE three names mean essentially the same thing, though it may seem strange to the enlightened citizens of this country that, aside from most of those who have adopted scientific professions, a dense ignorance exists as to the nature and uses of Graphite. Thus many molders maintain it to be unhealthy because it is *Black Lead* (probably associating the name of *White Lead* with it). It is *not Lead*, but simply a condition of carbon or pure coal, of which the finest and purest is the diamond, which, being crystallized, is the most perfect specimen. Like every article of commerce, it is graded in quality and has its different degrees of purity. The best quality of Graphite in its crude state is mined in the Island of Ceylon in the East Indies. A very fine Graphite is mined in New York State and in Canada, but this contains large quantities of quartz, which must be separated from the Graphite, entailing additional cost. *German Black Lead* of various grades is a graphitic clay. Our Blackstone Facings are ground from a graphitic coal. We presume that graphite, in sundry stages of purity, is found in every country on the globe, but not in a remunerative quantity or quality. We are direct importers of the Ceylon Graphite and German Black Lead, and besides have the most extensive establishments in this or any other country to employ and convert native graphite to manifold purposes. Refined Graphite, which is reduced to an impalpable dust, is denominated Electrotyping Plumbago. Then we have the refined, floated, foliated or flaky graphite from which every particle of foreign matter is removed, notably any grit it may have contained. This article, when reduced, is denominated Lubricating Plumbago, and in quality varies from the absolutely perfect to grades often very imperfect. It is used for many purposes, but this article has nothing to do with any of them except those pertinent to the iron trade. As a dry lubricant for blowing cylinders for rolling-mill machinery or any machinery that is liable to get hot or squeaky, it is invaluable, and acknowledged indispensable. It enters into the manufacture of crucibles for the melting of steel, iron, and brass. Castings of every description are made almost perfect by applying it in its proper condition to the molds. Of these conditions PURITY is paramount.

Ceylon Plumbago

There is no doubt that pure CEYLON PLUMBAGO, with a heavy body, will assist to produce the cleanest and brightest castings.

Pure Ceylon Plumbago

If properly used on the mold will save you money in cleaning and dressing the castings, after they leave the mold. We furnish the best grades suitable for your class of work, and we guarantee every pound of our CEYLON PLUMBAGO to satisfy you in every respect. It will give your castings a good blue-steel color.

East India Silver Lead

Most suitable for green sand or dry sand work. We make the grades and qualities suitable for your purpose. Our experience of over thirty years in the business is of some value to you.

Founders' Perfect Core Wash

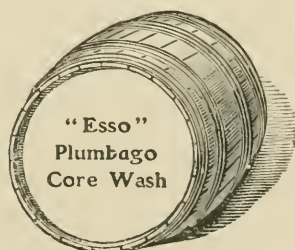
This is applied to the mold after mixing it with Molasses Water. It forms a hard skin or veneer on the mold, which does not run before the molten metal.

It is intended for dry sand and skin dried molds and for painting large cores.

"Esso" Plumbago Core Wash

The best Core Wash ever put on the market. Cores can be dipped or painted with Camel Hair Brush. Mix this Esso Core Wash with molasses water, and thin down to consistency of thick cream.

We are the largest importers of Ceylon Plumbago in the United States. We give you the best values



INDIA SILVER LEAD AND EAST INDIA PLUMBAGO

For Foundry Uses

No. 914 or 702	} For heavy castings	10	cents per lb.
No. 913 or 703	} Special heavy mining machine castings . . .	8	" "
No. 912 or 716	} Medium weight castings	7½	" "
No. 908 or 728	} Light castings	7½	" "
No. 909 or 710	} General jobbing work	6	" "
No. 905 or 712	} Esso Plumbago Core Wash	6	" "
No. 911 or 732	} Founders' Peerless Perfect Core Wash . . .	10	" "

Above prices in barrel lots.

In less quantities, add 2 cents per pound.

PLUMBAGO—GRAPHITE—BLACK LEAD

For Electrotyping, Lubricating, Etc.

Electrotyping Graphite (molding)	35	cents per lb.
" " (polishing)	40	" "
Esso Perfect Flake Lubricating Graphite	25	" "
Stove Polish Plumbago	10	" "
German Black Lead	3	" "
American Graphite No. 1	3	" "
" " No. 2	3	" "
Paint Graphite No. 1	4	" "
" " No. 2	2	" "

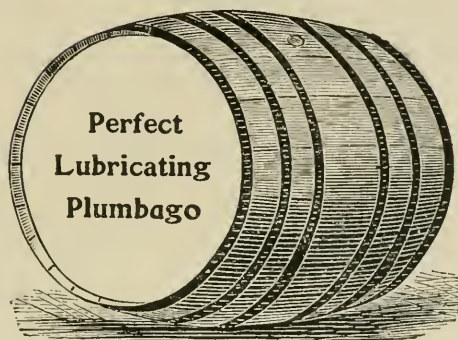
Special prices in large quantities.

All Plumbago packed in good strong barrels, paper lined.

Barrels contain 500 pounds.

Half barrels contain 300 pounds.

Kegs contain 100 pounds.



“ESSO” PERFECT LUBRICATING PLUMBAGO

THIS is Nature's own perfect lubricant. It is merely Ceylon Plumbago, reduced to flake, with all impurities removed.

“Esso” Perfect Lubricating Plumbago can be used successfully wherever friction exists. It is not affected by heat or cold, or acids. It can be mixed with oil or water and applied wherever a lubricant is required.

Within the past few years we have installed special machinery for the production of this material, and we can furnish same to the trade or consumer in any quantity.

Prices in bbl. lots	15 cents per lb.
“ one half bbl. lots	18 “ “
“ one hundred pounds	25 “ “
“ in cans	30 “ “

To the Dealers:

We are prepared to furnish this Lubricating Graphite, using your own brands if you desire.

NOTICE

We manufacture a special grade for use in blowing-engines in blast furnaces, also for steel manufactures.

BRISTLE BRUSHES

For Foundry and All Other Purposes

IT is a positive fact that we are manufacturing the **very best** qualities of **Molders' Hard and Soft Brushes.**

In our experience of over thirty years in the Foundry Supply business, we have found that the best goods are the cheapest, and this applies in particular to Molders' Brushes.



CINCINNATI PLANT WAREHOUSE NO. 2

A good brush will last three times as long as a cheap one, and it will do the work better.

A molder's poor brush is dear at any price.

All our brushes are made under our own supervision.

Special brushes made to order; send us your drawings.

We make steel wire brushes of all kinds.

MOLDERS' SOFT OR DUSTING BRUSHES

Russia Bristle Brushes are Sent Unless Otherwise Specified

We can furnish any Style, Size or Grade you Desire

You may search the world and you will not find a better brush for the purpose, both in quality and workmanship. We make only one grade of this style. The bristles are four inches long, selected Russia, wire drawn. The block in two parts securely glued and is screwed together. It is an extra large brush.

Price \$15.00 per doz.

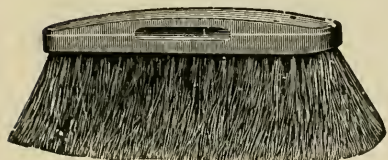


FIG. 1.

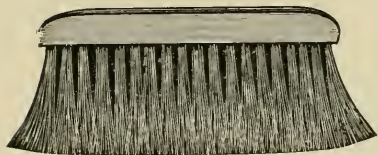


FIG. 2.

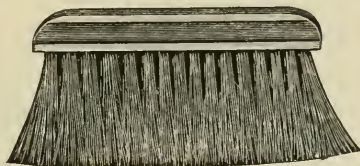


FIG. 3.

We recommend figures Nos. 2 and 3 soft brushes, which are wire drawn and of the best bristle. We recommend this type as we have studied the wants of the molders, and it is our aim to give them a satisfactory brush. The Russia Bristle Brush will cost more money, but will last longer and give the best of satisfaction. The prices on these two figures are the same, according to the size of block and quality of bristle used.

Best Russia Bristle	\$9.00 per doz.
" American Bristle	8.00 "
" Horse Hair Bristle	7.20 "
Mixed Bristle	6.00 "

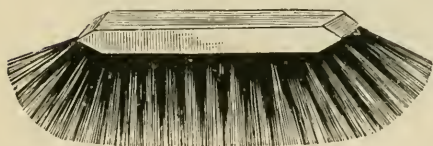


FIG. 4.

Machine Molders

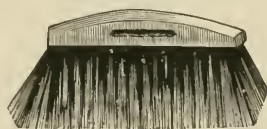


FIG. 5.

Stove Molders.

Figures Nos. 4 and 5 are the waxed or pitched brushes. These have the same kind of bristles as figures Nos. 2 and 3, but will fall out more readily

than the wire drawn. We do not recommend the pitch brushes, but some molders prefer to use them. The prices are the same. The No. 4 brush has a larger block and is used by machine manufacturers, while the No. 5 is used by stove manufacturers.

Best Russia Bristle	\$9.00 per doz.
" American Bristle	8.00 "
" Horse Hair Bristle	7.20 "
Mixed Bristle	6.00 "

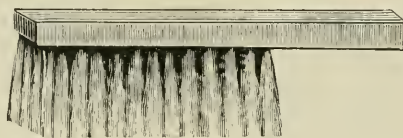


FIG. 6.

Flask and Core Brushes

Mixed Bristle	\$6.50 per doz.
Best Pure Bristle	7.50 "

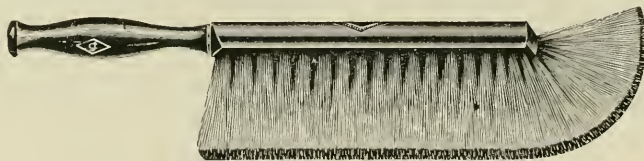


FIG. 7.

Machinists and Molders' Bench Brushes

Pure Bristle	\$10.50 per doz.
Mixed Bristle and Tampico	9.00 "

Our Molders' Brushes are made for rough usage in the foundry.

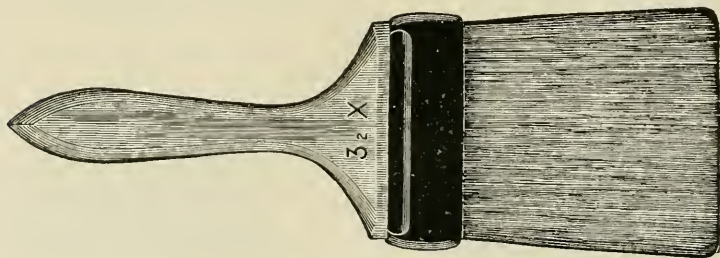


FIG. 7½

Rubber Set and Bound Flat Brush

Length of bristles extending from $2\frac{1}{2}$ in. to $4\frac{1}{2}$ in. from block.
All sizes in stock from $2\frac{1}{2}$ in. to $4\frac{1}{2}$ in. in width. Write for prices.

HARD OR STIFF BRUSHES

For Brushing Iron Patterns

Russia Bristle Brushes are Sent Unless Otherwise Specified.

We Can Furnish any Style, Size or Grade You Desire

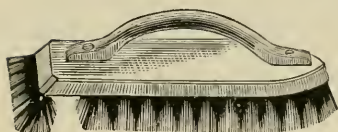


FIG. 8

Medium Size

Extra quality selected

Russia Bristle . . \$12.00 per doz.

Russia Bristle . . . 6.50 "

American Bristle . . 4.50 "

Tampico and Bristle 3.00 "

Extra size, 1 1/2 inch, stock.



FIG. 9

Medium Size

Russia Bristle . . . \$6.50 per doz.

American Bristle . . 4.50 "

Tampico and Bristle. 3.00 "

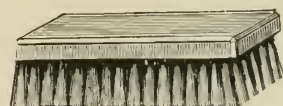


FIG. 10

For Stove Foundries

Russia Bristle . . . \$7.20 per doz.

American Casings

Bristle 6.50 "

American Bristle . . 5.50 "



FIG. 11

Large Size Only

Russia Bristle . . . \$8.50 per doz.

American Bristle . . 6.50 "

Tampico and Bristle 4.00 "

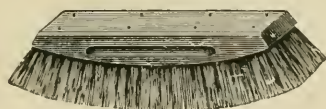


FIG. 12

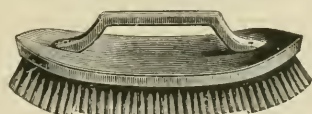


FIG. 13

Stove Foundries—Extra Size

Extra quality selected

Russia Bristle . . \$10.00 per doz.

Extra quality selected

American Bristle 7.50 "

American Bristle . . 6.00 "

Russia Bristle . . . \$6.50 per doz

American Bristle . . 4.50 "



FIG. 14

Core Box Brushes—Best Russia Stiff Bristle

Width, 1/2 inch . . . \$4.00 per doz. Width, 1 1/2 inch . . . \$5.50 per doz.

" 3/4 " . . . 4.25 " " 1 3/4 " . . . 5.75 "

" 7/8 " . . . 4.50 " " 2 " . . . 6.00 "

" 1 1/8 " . . . 5.00 " " 2 1/2 " . . . 6.50 "

" 1 1/4 " . . . 5.25 "

Bristles extend one inch from block.

Remember, we have had thirty years' experience in manufacturing brushes.

CORE PAINTING BRUSHES

These brushes are carefully made and well adapted to liquid use. We furnish them bound with tin or brass. The bristles are selected American, but we will quote prices with Russia Bristles upon application.

These quotations are on tin-bound brushes (Fig. 15).

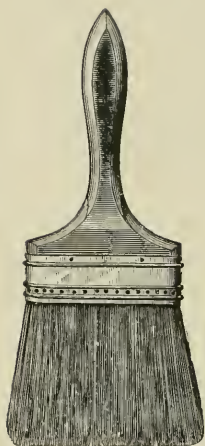


FIG. 15.

Width	$\frac{3}{4}$ inch		\$ 1.75	per doz.
"	1	"	2.00	"
"	$1\frac{1}{4}$	"	2.25	"
"	$1\frac{1}{2}$	"	2.75	"
"	2	"	3.50	"
"	$2\frac{1}{2}$	"	4.50	"
"	3	"	5.50	"
"	$3\frac{1}{2}$	"	7.50	"
"	4	"	8.50	"
"	$4\frac{1}{2}$	"	9.50	"
"	5	"	10.50	"
"	6	"	12.00	"

Flat Bristle Brushes
For Painting Cores

Large core brushes for gas and water pipes (not bristle), \$6.00 per dozen.

Double Thick and Brass Bound

These brushes are made EXTRA THICK of picked camel hair. The brass binding having its edge turned under gives additional security to the hair and prevents it from cutting on edge of binding, which frequently happens and causes the hair to come off on the work.

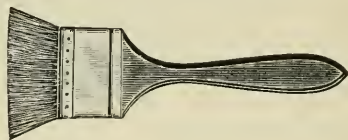


FIG. 16.

Camel Hair Brushes

Width, 1	inch	. . \$ 7.20	per doz.	Width, 2	inch	. . \$14.45	per doz.
"	$1\frac{1}{4}$	" . . 9.00	"	"	$2\frac{1}{2}$	" . . 18.00	"
"	$1\frac{1}{2}$	" . . 10.50	"	"	3	" . . 20.00	"
"	$1\frac{3}{4}$	" . . 12.60	"	"	$3\frac{1}{2}$	" . . 30.00	"

Write for Discounts

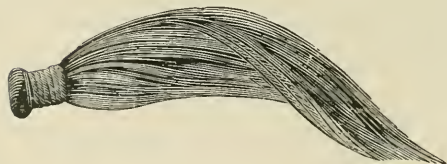


FIG 17

Swabs

Hemp		\$2.00	per doz.
Flax		2.75	"

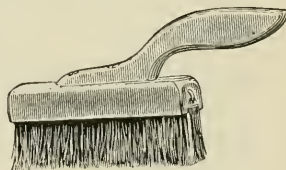


FIG. 18

A Splendid Lathe Brush
Machinist No. 19

Excellent for Brushing Lathes and Planers,
Price \$2.50 per doz.

Molder's (Combined) Pattern Double Brushes and Dusters

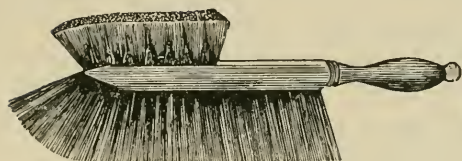


FIG. 19

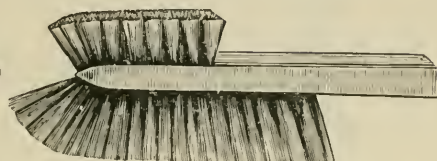


FIG. 20

These brushes are all carefully made and will outlast others of this style. The upper part is stiff Tampico and bristle. The lower part is pure soft bristle.

No. 19. Best Bristle \$9.00 per doz.

No. 20. Bristle 7.20 "

We manufacture our own brushes, so we can furnish the kind suitable for your purpose.

Flat Bristle or Varnish Brushes

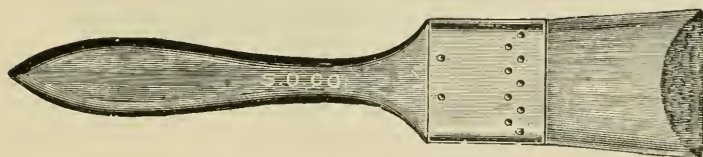


FIG. 21

Triple thick. Finest French bristle, perfectly chiseled. This is the finest brush obtainable for finest finishing. Beaver tail handle.

Width, 1 inch; length of bristle, 2 inch . . \$ 8.00 per doz.

" 1½ " " " 2¼ " . . 10.00 "

" 2 " " " 2½ " . . 16.00 "

" 2½ " " " 2¾ " . . 24.00 "

" 3 " " " 3 " . . 32.00 "

Order our Molders' Hard or Soft Brushes for a trial.

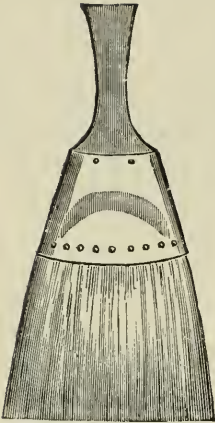


FIG. 22

Bristle Fan or Top Finishing Brushes

In Tin. Cedar Handles.

Width, 1, 1½, 2, 2½, 3, 3½ and 4 inches.

Price per inch 28 cents

Camel Hair “SPLIT QUILL” Brushes

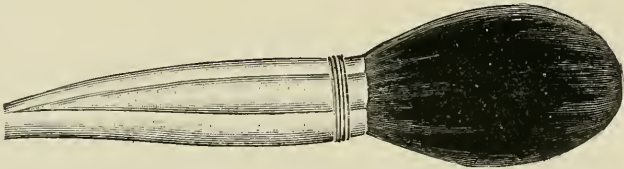


FIG. 23

2 Quills	\$5.00 per doz.	5 Quills	\$ 9.00 per doz.
3 “	6.00 “	6 “	12.00 “
4 “	7.00 “	8 “	18.00 “

Bristle Core Round Brushes

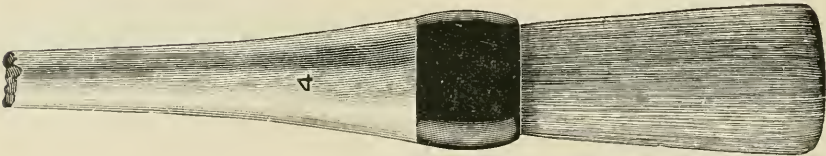


FIG. 24

Can be used for cores in order to get into small corners.

Length of bristle, 2⅝ inch \$16.00 per doz.

NICKEL PLATERS' RUSSIA BRISTLE BRUSHES

These are acceptable Core-box Brushes, but rather high priced to use for the latter purpose. They are made of the best quality of Russia Bristles, *stiff* and warranted to withstand *acid* in any liquid form.



FIG. 25

1 $\frac{1}{8}$ inch wide and contains 92 pods of bristles, 4 pods wide by 23 long. Price, \$7.50 per doz.



FIG. 26

$\frac{7}{8}$ inch wide, contains 115 pods or bunches of bristles, 5 pods wide by 23 long. The pods, however, are smaller than those in the 1 $\frac{1}{8}$ -inch brushes. Price, \$7.50 per dozen.

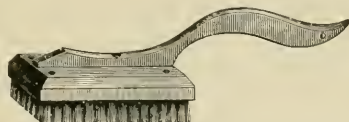


FIG. 27

These are extra quality stiff Russia Bristles. The pods are bunched in large holes and the brush is particularly strong and well made, the top being screwed on. They contain 120 pods, 8 pods wide by 15 long. Price, \$12.00 per dozen.

In the above styles of brushes the bristles extend one inch from block.

Platers' Washout Brushes

Prices per Dozen



FIG. 28

Straight or Bent Handle.

No.	No. of Rows.	Pure Russia.	Mixed Bristle	Gray Tampico.	White Tampico.
260	1	\$3 50	\$2 50	\$1 30	\$1 20
261	2	4 50	3 50	1 70	1 50
262	3	6 00	4 50	2 60	2 30
263	4	7 00	5 50	3 50	3 00
264	5	8 50	6 00	4 30	3 70
265	6	9 50	7 00	5 20	4 50

PATENT STEEL WIRE BRUSHES

Patent Hinged Bridle Cleaning Brush

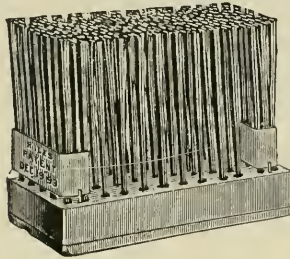


FIG. 29

For General Use in Cleaning Castings

This brush will outlast any other, the bridles on the ends of the brushes preventing the wires from vibrating—vibrating causes the wires to become brittle. This trouble is obviated with our patent bridle brush.

A trial will convince you of the advantages.

Price, 4-Row Brush, \$8.40 per doz.

5-Row Brush, \$9.60 per doz.

For Cleaning Heavy Castings

No. 0,

No. 1,

No. 2,

Either 4 or 5 Rows
Wide.

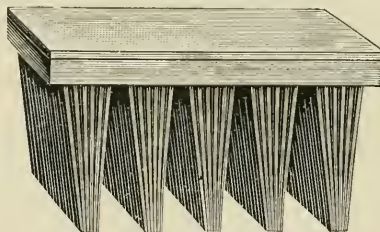


FIG. 30

Beware

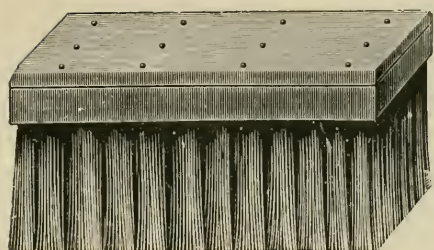
Of

Infringements

The above cut is a fac-simile of our *Patent Brush*. Consumers of wire brushes will readily recognize the *true and correct principle* on which it is constructed. In the old brushes the *vibration* of the wires which pressed backward and forward suddenly by the user in cleaning castings *produces crystallization*, and causes them to *break off close to the edge or shoulder of each perforation*.

Price, 4-Row, \$8.40 per doz.

5-Row, \$9.60 per doz.



STEEL WIRE CASTING OR CLEANING BRUSHES

FIG. 31

Square Brush

No. Rows. Width.	No. Rows. Length.	Length of wire extending outside of block.	Price Per Dozen.	No. Rows. Width.	No. Rows. Length.	Length of wire extending outside of block.	Price Per Dozen.
1		2 in.	\$2 00	5	14	3 "	\$6 00
1	12	2 "	2 25	4	12	4 "	6 00
2	12	2 "	3 25	4	14	4 "	6 25
2	12	3 "	3 50	5	12	4 "	6 50
2	12	4 "	3 75	5	14	4 "	6 75
3	12	2 "	3 75	4	12	5 "	6 75
3	12	3 "	4 00	4	14	5 "	7 50
3	12	4 "	4 50	5	12	5 "	7 50
4	12	2 "	4 25	5	14	5 "	7 75
4	12	2 "	4 50	4	12	6 "	7 75
4	14	3 "	5 25	4	14	6 "	8 25
4	12	3 "	5 50	5	13	6 "	8 50
5	14	3 "	5 75	5	13	6 "	9 00

Extra sizes made to order. State if you want fine or coarse wire. Warranted best Bessemer steel.



FIG. 33

Round Brush.

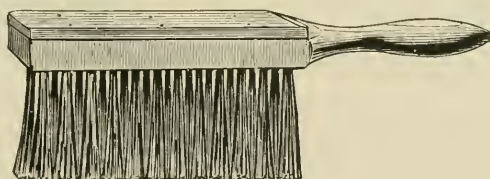


FIG. 32

Oblong Brush, with Handles

Four Rows Wide

Same sizes as above list are carried in stock.

Round Brushes for Cleaning Castings

Length of wire, extending outside of block, 4 inches,	\$6 00
" " " " " 5 "	6 50
Iron bound, extra quality and strength . . 6 "	8 00

Steel Wire Casting Broom

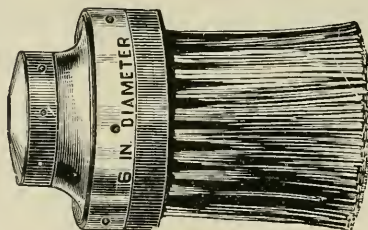


FIG. 34

For Cleaning Large Pulleys, Car Wheels, Rolling Mill and Blast Furnace Castings.

Price, \$13.50 per dozen.

Extra sizes and steel wire brushes of any description made to order.
Quotations mailed on receipt of a sketch and dimensions.

Upright Steel Sweeping Brooms

For Freight and Cattle Cars, Street Railways, Streets, Stables, Docks, Factories, Iron Works, Railroads, Steamboats, Sugar Refineries, Oil Refineries, Tank Cars, Tanneries, Rolling and Paper Mills, Gas and Glass Works, Street Pavers, Packing Houses, Furnaces, Breweries, Malt Houses, Distilleries, etc. They are the best Brooms ever made for the purpose. They can be used on Cement Floors, Asphalt, Wood or Brick Floors, Coolers, Tubs and Hogsheds. Warranted *not* to scratch the finest varnished tub. These Brooms are not to be compared with other Steel Brooms that have been sold for years; they are made on an entirely new principle, of the best and *finest* steel wire. Warranted to sweep cleaner and better than any broom made. They will outwear twenty-five of the ordinary brooms.

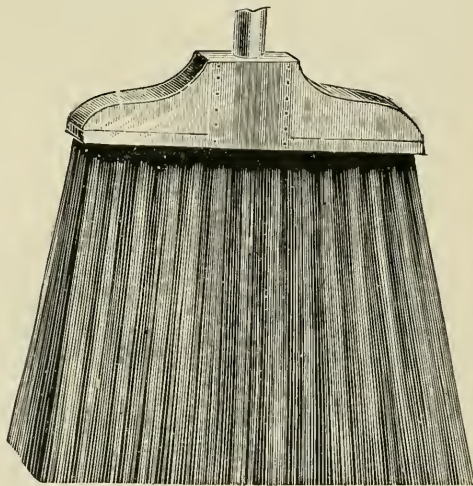


FIG. 35

Great care is used in tempering to secure the required elasticity and strength for the purposes intended.

Price, \$20.00 per dozen.

HEAVY STEEL WIRE CASTING BRUSHES, BROOMS, ETC.

For Heavy Work

Car Track Brooms

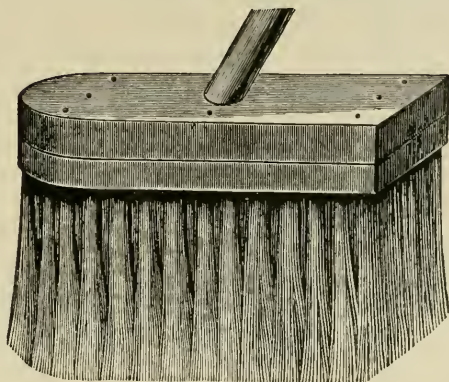


FIG. 36

For Rough Sweeping About the Factory

Price, \$36.00 per dozen

Sweeping and Scrubbing Brooms

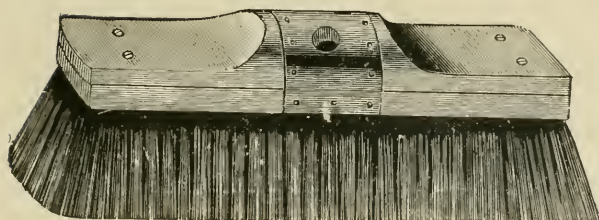


FIG. 37

For Sweeping Purposes

To take the Place of Corn,
Rattan or Bass
Brooms

Steel Push Sweeping and
Scrubbing Broom for
Light and Coarse
Sweeping,
Cleaning and Scrubbing

Fine Steel Wire Machinist's Bench Brush

Made of very fine steel wire, for sweeping off Planers, Lathe and Drills. Warranted to outwear fifty best bristle brushes.



FIG. 38

Price, \$9.00 per Dozen

FLUE AND SPIRAL TUBE STEEL WIRE BRUSHES

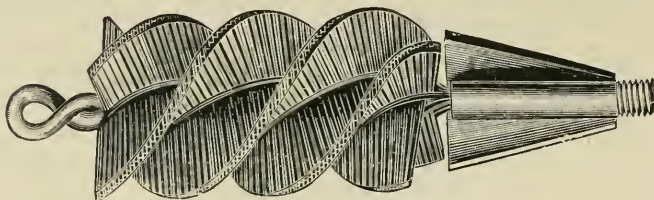


FIG. 39

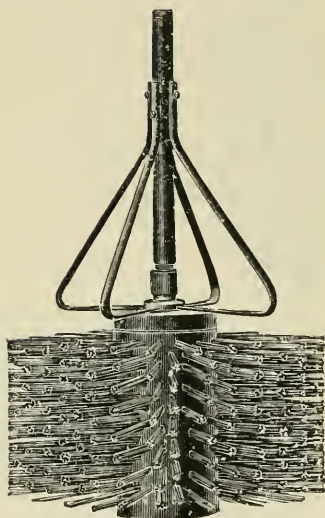


FIG. 40

For cleaning the flues or the tubes of steam boilers, thereby economizing fuel to a greater extent than any patent arrangement for that purpose. Parties interested will duly appreciate the merits of an invention designed to keep the flues or tubes of steam boilers in the best possible condition to produce steam. Ashes, soot and other deposits are well known to be non-conductors of heat. Figure 40 shows our large flue brush with iron guard. At a glance you will perceive that it is the best made. The center or wire cones being enclosed at each end with cast iron and having a flange all around of one inch, makes it impossible for the brush to slip or come apart in the flue. The braces at the end strengthen the brush and serve to slide it into the flue again in case it is pushed entirely through, saving the trouble of crawling over the boiler and lifting it in as with other brushes. We make any size, from 4 to 24 inches diameter. When ordering specify style desired. **Price, \$1.00 per inch on either style.**

Steel Wire Brush with Long Handle

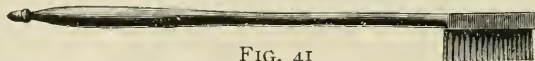


FIG. 41

For Cleaning Out Pipes, etc.

Price, \$12.00 per dozen

Under Boiler Broom

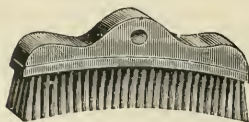


FIG. 42

Will keep the rust from destroying the boiler at the bottom.

Price, \$36.00 per dozen

Inside Boiler Broom

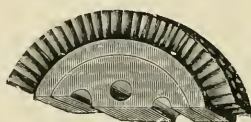


FIG. 43

Will keep the inside of boiler free from scales or rust.

"RELIANCE" STEEL WIRE WHEEL BRUSHES

Can be placed on an ordinary emery grinder. Suitable for cleaning all kinds of castings. Especially designed for Platers, Stove Manufacturers, and Hardware Manufacturers; also used by Cycle Makers.



FIG. 44

"Reliance" Wheel Brushes Complete, Including Metal Hub

Number.	Diameter.	Width of Face.	List.
50	15 in.	2 1/2 in.	\$15 00 each.
53	12 "	2 "	13 50 "
54	10 "	1 3/4 "	12 00 "
55	8 "	1 1/2 "	10 50 "

State Size Arbor Hole Required

No. 50 brush is the one in most general use.

Nos. 50, 53, and 54 are regularly made for arbors 1 1/2-in. and smaller.

No. 55 for arbors 1-in. and smaller. For larger sized arbors there will be an additional cost.

The finer grades of sections or fillers can be furnished of *Brass Wire*.

Sections or Fillers for "Reliance" Steel Wire Wheel Brushes



FIG. 45

Brush No.	Section No.	Sections Per Set.	List.
50	3314	6	\$7 50 per set.
53	3411	5	6 50 "
54	358	5	6 00 "
55	365	4	5 50 "

In our "Reliance" Wire Wheel Brushes we have listed only those sizes which are in general use. Our invention enables us to make these goods just as large as may be required. There are now in use a considerable number of 15-in. and 18-in. diameter brushes, with face varying in width from 4 1/2-in. to 12-in. These brushes are all so constructed that *when worn out, the refillings or sections (as shown above) can be replaced by any operator, thus saving the delay and expense of returning the hub to us.*

These Wire Wheel Brushes are proving of great advantage for a variety of purposes aside from platers' and foundry use. They are suitable for polishing, cleaning and refinishing all kinds of metal; also for removing scales from hot forgings, tools, etc.

Special sizes and sections made to order.

BRUNNELL'S PATENT WIRE WHEEL BRUSH

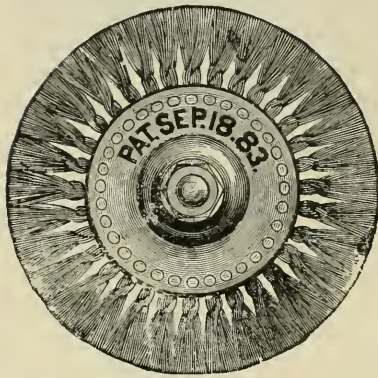
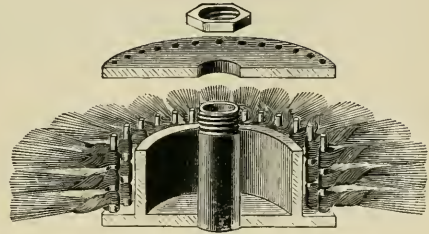


FIG. 46



A New, Useful and Practical Invention

For Scouring, Buffing and Cleaning All Kinds of Castings

Specialy Adapted to Stove and Mantel Manufacturing, Electro Plating and all Machine Work.

Its simplicity, durability and practicability recommends itself to all manufacturers who desire a rapid and efficient means of cleaning, polishing and buffing both plain and difficult castings.

For the most speedy cleaning of small gear wheels and preservation of the sharp edges of the teeth this wheel brush can not be excelled.

This invention, which is made of steel, allows the wire to be easily replaced when worn out, by means of a removable nut and disk on the front part of the wheel.

DIRECTIONS

Any kind of wire can be used, but after ten years' experience the use of bright wire No. 23, or broom wire No. 22, is recommended.

To insure good work this wheel should run at about 1,000 revolutions per minute, though it can be operated safely at any speed.

Care should be taken not to bear too hard against the wire, as by doing so the side, instead of the point of the wire, comes in contact with the work, rendering liability to bend; but should this happen, simply reverse the wheel.

In order to get the cutting point of the wire, bring the wire barely in contact with the end of it and better and more rapid results will be obtained.

The wheel should have a bonnet-shaped piece of sheet iron covering it about half way to prevent injuries by wire striking the operator, as occasionally there may be a loose wire.

It is in use in many foundries and machine and plating shops, to any of which we will with pleasure refer you.

The hub of this brush is made in two sizes, four and seven inches in diameter; the brushing surface can be extended to almost any size. In ordering please give us the diameter of the shaft on which you intend to place it. Price, \$20 each.

Extra sets of wires to replace those worn out, five pounds to each brush, 25 cents per pound.

BRUSHES SPECIALLY MADE FOR PLATERS AND METAL FINISHERS

Circular Scratch (Satin Finish) Brushes

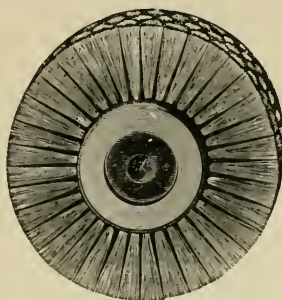


FIG. 47

For heavy use, made very strong of coarse brass and steel wires, centers filled with lead.

Diameter.	1 Row.	2 Row.	3 Row.	4 Row.	5 Row.
2½ in. each	\$ 2 50	\$ 3 75	\$ 5 00	\$ 7 00	\$ 9 00
3 " "	3 00	4 50	6 00	8 00	10 00
3½ " "	4 50	7 00	9 00	12 00	15 00
3¾ " "	5 00	8 00	11 00	14 00	18 00
4 " "	6 00	9 00	12 00	16 00	21 00
4¼ " "	6 50	10 50	13 50	18 50	24 00
4½ " "	7 00	11 50	14 50	20 50	27 00
4¾ " "	7 50	12 00	15 00	22 00	29 00
5 " "	8 00	13 00	16 50	24 00	32 00
5½ " "	9 00	15 00	18 50	27 00	36 00
6 " "	10 50	16 50	21 50	30 00	39 00
6½ " "	11 00	19 00	24 00	36 00	42 00
7 " "	12 00	21 00	27 00	40 00	48 00
7½ " "	13 00	24 00	30 00	44 00	54 00
8 " "	14 00	25 00	33 00	48 00	60 00

In ordering brushes state size of center block and arbor hole, number of rows, size of wire, and the work for which the brush is intended.

GATE SPOOLS

We can furnish these Gate Spools in several sizes. We have one STANDARD SIZE we carry in stock, which we find is used extensively in Stove Foundries.

Price on STANDARD SIZE \$2.50 per dozen

They are made of dry, selected, seasoned wood.

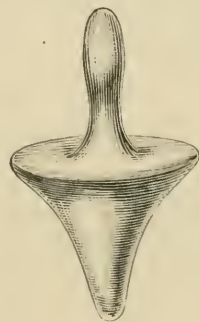


FIG. 48

Obermayer's Prepared Iron Filler

READY FOR USE

You May Need it for Blow Holes, Patching or Defects
in Castings

SUPERIOR TO ANY OTHER IN THE MARKET

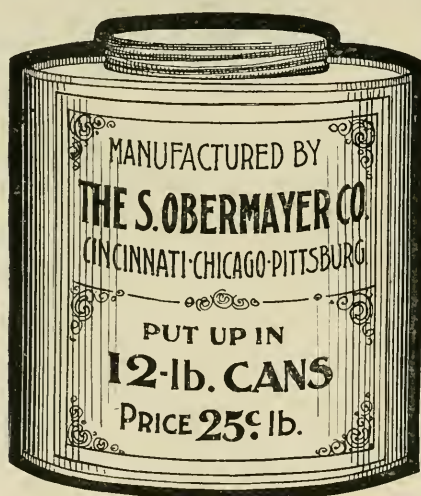


FIG. 49

Its use is not confined to Iron Founders and Machinists because it is adapted for all kinds of Leaks in Water, Steam or Gas Pipes, Boilers, Oil Tanks, Cisterns, Hydraulic Machinery, Caissons, Gaskets, Cylinders, Flanged Connections, etc.; blemishes or pitting in Hulls of Iron or Steel Ships.

In 25-Pound Cans	25 cents per lb.
In 12 " "	30 " "

Directions for use are very simple and as follows: "This can be applied with a knife, the same as putty, but care should be taken not to get it too thick; or it can be thinned with turpentine and applied with a brush." It will dry hard in twelve hours and retain same color as the casting.

National Iron Filler Cement

THIS is a metallic compound in dry powder form, ground extremely fine, which, when mixed with water to a consistency of thick paste and allowed to dry a few hours, becomes as hard as iron, entirely insoluble in oil or water, and proof against intense heat.

It quickly and easily repairs any Blowholes, Cracks or Imperfections in any Iron or Steel Casting which it matches in color. It does not chip out.

Don't Throw a Large Casting away on Account of a Small Imperfection or a "Blow Hole"

**We Can Save the Casting
We Can Save You Time
We Can Save You Money**

**We Can Save You Trouble
We Can Save Your Soul**
(by preventing you from using a lot of bad words)

AND ONLY BY USING

NATIONAL IRON FILLER

Which is the same color of the casting and it gets hard as the iron, and sets in less than 20 hours and remains as hard and tough as the iron itself



FIG. 50

PRICE, 25 CENTS PER POUND

No More, No Less

Put Up in 12-Pound Cans

Directions for Use—Measure out enough National Iron Filler to fill the defect, and add sufficient water to make a thick paste. Put the material into the hole and smooth with a Putty Knife. Keep dry and always see that the can is kept closed.

THIS IRON FILLER IS A GREAT SUCCESS

STAR STEEL CORE COATING

THE formation of smooth and approximately accurate holes in iron or brass castings always involves trouble and expense. The method proposed by us is to substitute, when possible, a little extra attention and labor in the foundry for the wear of machine tools, supplies, power and labor of the machine shop. Broadly speaking, the improvement suggested is to insert steel cores of the shape and size of the shaft or bar for which the hole is to fit in the mold and afterwards remove them from the casting. This has been done in many foundries for years, except for special work, where tapering cores must be made so they may be removable and the crystallization and chilling of the iron makes it difficult, if not impossible, to do any further work on a casting that cannot be brought to the emery wheel. These objections have prevented the general use of steel cores.

It will be admitted, however, if these steel cores can be coated with a composition which will resist the heat and pressure of the melted iron, be non-conductive enough to prevent "chilling," and free from gas producing substances as to reduce the liability of "blowing" to a minimum, of a nature not antagonistic to the iron, where it will lay, hard enough when placed upon the steel cores to bear ordinary handling, and after the casting has been made, to become so soft as to offer no resistance to its removal, the use of steel cores is capable of a greater adaption to modern foundry work than it has yet been given. It is not asserted that a steel core will work in all places. It cannot compete with a sand core for producing a hole that is as perfect as made with the sand core without drilling or reaming. It has been found impracticable to cast a thin shell around a large steel core, but thinner shells can be cast around a steel core standing on end than lying down in the mold. A thinner shell can be cast around a well proportioned mold with thin webs if the metal can be poured slowly.

Good enough holes can be made with sand cores, steel cores, a drill or reamer according to the work. Between steel cores and drilling there is not much choice if the drill is ground true and held solid, but the steel core is much cheaper. It does not cost anything for jigs or fixtures, and it is a good way of saving shop costs.

It has been proven that **Star Steel Core Coating** is the only successful preparation. One pound properly thinned will make enough castings to cover nearly 900-1 $\frac{2}{3}$ inch cores, or 2,000 one-half inch set screws.

Put up in One and Five Pound Cans
\$1.25 per Pound

This is Particularly Useful for Agricultural Implement castings.

WE ARE SHIPPERS OF

Albany
Zanesville
Centerton
Newport
Sandusky
Indiana

**MOLDING
SANDS**

for

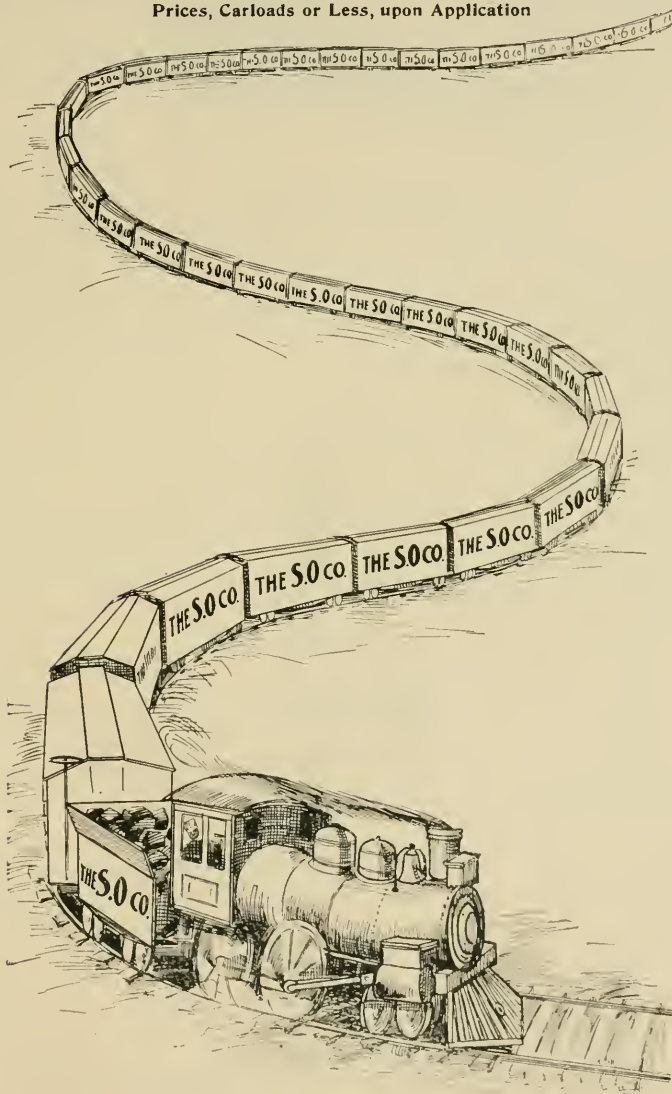
Heavy, Light
or Medium
Castings

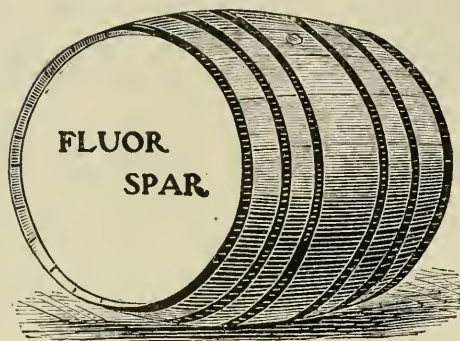
White Core Sand; also Ganister,
Fire Brick and Welch
Mountain Clay

We manufacture and Grind Special BRASS
MOLDING SAND for Fine
Ornamental Castings

We furnish WINDSOR LOCK MOLDING SAND for Aluminum and Brass Work

Prices, Carloads or Less, upon Application





FLUOR SPAR

Have you ever used FLUOR SPAR in your Furnaces or Cupola?

If not we desire to call your attention to the following benefits derived from its use:

1. It will save from 3 per cent. to 5 per cent. more Iron than Limestone.
2. It will reduce the Sulphur and Phosphorus.
3. It will increase the Silicon and Manganese.
4. It will increase the Tensile Strength of iron and steel.
5. It will increase the Capacity of your Furnace or Cupola.
6. It will increase the Heat and Save Fuel.
7. It will lengthen the life of your Furnace Blocks and Lining.
8. It will save the Labor of handling Limestone and Cinders.
9. It will Fluid and Clean the Iron from all impurities.
10. It will Fluid the Slag.
11. It will Clean your Furnace or Cupola.

It is the only natural Flux known in the world for all kinds of metals, and should be used in all Furnaces, Converters, Cupolas, Crucibles, etc. Six (6) pounds of Fluor Spar to the ton (2,000 lbs.) of iron will be sufficient in most cases.

Price in Barrel Lots, \$25.00 per Ton

Special Price in Car Loads

Special Circular Furnished With Full Description on Application

PEERLESS DRY CORE COMPOUND

This Compound is, as its name implies, a substitute for flour, rosin and other materials formerly used in making foundry cores. It has been in use for more than fifteen years, and is still the reliable compound for mixing with core sand.

Cores made with this mixture are more solid and compact; it prevents blowing and swelling, and can be easily removed by a few raps on the casting. This obviates the necessity of slow laborers' annoyance, which is an expensive charge to foundrymen.

Directions for Using the Peerless Dry Core Compound

As the quality of sand used in making Cores in various localities differs, it is impossible to give the exact proportions to be used; but tell your Coremakers to use the PEERLESS DRY CORE COMPOUND in place of *flour or anything else you have been using*, and in about the same quantities. *If your Core is TOO STIFF USE LESS*, or if *NOT STIFF ENOUGH*, use more of the PEERLESS DRY CORE COMPOUND.

After one or two trials you will get the correct proportion for *your* Core Sand.

For Large Cores

Take 1 shovelful of PEERLESS DRY CORE COMPOUND to 10 or 12 shovelfuls of ordinary Core Sand; if the Core is too stiff add two shovelfuls of Burnt Sand, such as is scraped from castings.

For Small Cores in Brass Foundries

The following are the directions: Use two pounds of the Compound to one bushel of Iron Founders' Burnt Sand, such as is scraped or falls from their castings, sifted through a No. 14 Sieve, this proportion of each to be mixed thoroughly; and when used to be mixed with Water. For all Cores above 1 inch in diameter, add 1 quart of Sharp Sand.

Our object in putting this on the market as a Compound, and not the Core Sand ready for use, is to avoid the expense of transportation, which can be readily understood. Packed in barrels of about 225 pounds. It will be to your advantage to give it a trial.

Our improved Esso Core Wash can not be excelled by any in use, and it is furnished for less money than any other of more pretentious claims.

Trial Samples Sent Free of Charge

MOLDERS' WAX TAPERS

For Venting Cores

WAX Tapers are used as an improved method of venting cores, where complicated connections have to be made, permitting the free flow of gas from the core. In making port cores for cylinder work, it would be very difficult and slow work to connect all the vents made by the ordinary method of wire-venting, whereas the Taper can be rammed up in the core and left there. Then the heat melts the wax and leaves a perfect connection for vent. In numerous other instances the Wax Taper can be used to much better purpose at considerable saving of labor.

They being very light in weight, the cost is so small that the value of the individual Taper can scarcely be computed. The size or length can be varied to suit the emergencies. We can supply any length or thickness, the standard size being $\frac{1}{4}$ inch diameter by 18 inches long, this size taking about fifty Tapers to a pound.

In stock ready for immediate shipments.

Price 60 Cents Per Pound

Put Up In 1, 5 and 10 Pound Packages

Invaluable for Cylinder Castings

HIGH GRADE FOUNDRY ROSIN

Our Rosin is especially selected and graded for the Core-room. We are the only concern who can furnish you with crushed Rosin.

We have at all times a large stock of Rosin, and are, therefore, in a position to furnish it at lowest market prices, *in car loads* and in barrel lots.

Our machinery is especially adapted for Ground or Pulverized Rosin.

FOUNDRY OR CORE FLOUR

We have contracted for the entire output of one of the largest flour mills in this country, and can make shipments direct, thereby saving you time and freight charges.

We furnish the best foundry flour for core work, and always carry a large stock on hand in our warehouses, and can fill all orders promptly.

Lowest market prices on application in ton lots and car loads.

We make a *Specialty* of flour for core work in foundries.

Special Price on Genuine Rye Flour

NEW ORLEANS BLACK STRAP FOUNDRY MOLASSES

Extra Thick and Heavy

It can be thinned down to any consistency wanted.

Our Molasses is not to be compared to ordinary grocers' Syrup. One gallon of our Black Strap Foundry Molasses will go further in use, and will make three gallons of the ordinary Syrup.

Price, 15 Cents Per Gallon in Barrel Lots

Special price in *Car Load* lots, which we ship direct from our Plantation, thus saving you time and freight.

PEERLESS STOVE PUTTY

Sold in Kegs, Tubs, Half Barrels and Barrels

Our Stove Putty is very elastic and adhesive, will not burn or crumble, perfectly fire-proof, used to fill up joints, cracks, etc.

It is mixed with a pure vegetable oil; it has none of the bad features or the fishy odor of the many inferior and cheaper articles on the market.

In Tubs of	100 lbs. each	6 cents per lb
In Kegs of	200 " 	5 " "
In Half Barrels of	400 " 	4½ " "
In Barrels of	800 " 	4 " "

GRIND STONES

Mounted and Unmounted

Wet and Dry all sizes. Quality the best. All Orders Filled Promptly

In Ordering, state for what Purpose Stone is to be used

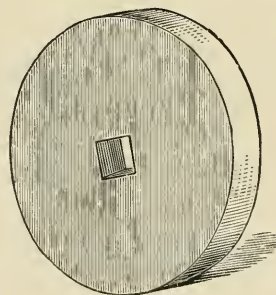


FIG. 51

Price, \$35 per Ton

Stones Shipped Direct from Quarry to Save Freight

**We Make a Specialty of Selecting Grind Stones for
Foundry Use**

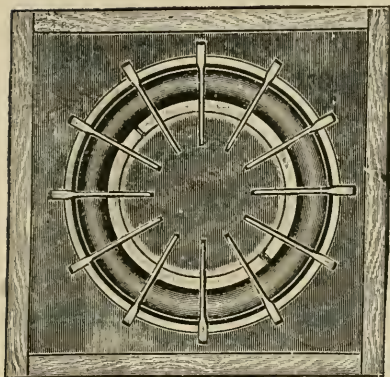


FIG. 52

will neither swell nor shrink. It is light and strong and improves with age. We obviate chiseling the Follow Board from wood by the use of our COMPOUND. This exceeds other compounds known for matches or for similar purposes.

Directions for Using

Select location for the pattern, ram up drag and make partings in the usual way. Shake the Liquid Compound thoroughly before using. Oil the exposed portion of pattern. Then shake on a thick coat of powdered Soapstone or Talc.

A wooden frame should be made with strips crossways, which should not be more than $\frac{1}{2}$ in. deeper than pattern; do not use a solid bottom board, but leave space between the strips through which to pour the Compound when mixed. Place this frame on drag, adjust clamps or weights; take enough of dry Compound and heat it until lukewarm; then stir the Liquid Compound and mix with the dry thoroughly, using just enough to permit of it being poured. After which set it aside for one hour, then turn the top frame over, take off the sand and place the newly made Follow Board in a temperature of 300 degrees. The material will get perfectly dry and hard over night, it will resist dampness, remain hard and will be ready for use the next morning. Leave the pattern on the

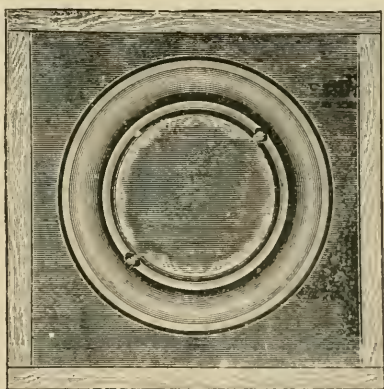


FIG. 54

PEERLESS FOLLOW BOARD COMPOUND

Something New in Foundry Practice

YOU KNOW THE COST OF FOLLOW BOARDS

WE have a composition of chemicals in *powdered* and *liquid* form which, when properly used, becomes as hard as the wood. It will produce perfect partings with sharp, hard, durable edges. It

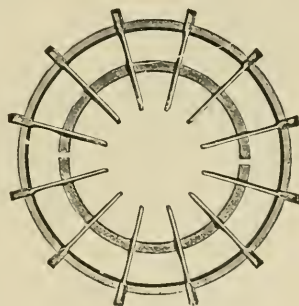


FIG. 53

board until the compound becomes hard and thoroughly dry, after which give it one or two coats of shellac and same will be ready for use.

Fifty pounds dry and five gallons liquid Compound will be sufficient quantity to give a good trial; smallest package sold. Put up in larger quantities of 500-pound barrels and 50-gallon packages.

It will save you about sixty per cent in making Follow Boards in comparison to the old method. A trial order will convince you how much money can be saved. Write for prices.

TICEOLEUM

For Dressing Iron, Brass, Composition, Metal and Wood Patterns

Ticeoleum will not gum the patterns. Will not need heat. It will not allow the pattern to rust. Patterns dressed with TICEOLEUM will not corrode or rust. It dries quickly on the pattern, leaving a hard surface like enamel, smooth as glass, and prevents anything from adhering to it.

Considering quality and the service it renders, **Ticeoleum** ranks far above the realms of competition among so-called **pattern dressings**, hence its value as such is incomparable.

It is a new departure and does not contain a particle of acid or beeswax.

Ticeoleum prevents sand or facing from sticking to the pattern when it is returned to the mold to be printed.

Particularly useful when molding small or difficult pieces, as it assists in drawing the patterns very readily.

Directions

Remove all wax or rust from patterns. Shake the can well and pour out a small quantity of Ticeoleum Pattern Dressing (as much as you think will cover the pattern) into a dish pan. PUT THE SCREW-CAP ON THE CAN TO PREVENT EVAPORATION. Apply the Dressing to the pattern with a rag or small brush, and, before it dries, commence to polish it with a hard bristle brush. It is advisable when a pattern is dressed the first time with this dressing to give it TWO COATS. After polishing the last coat finish the pattern with a few rubs with a dry cloth.

Price, 50 cents per Quart or \$2.00 per Gallon

Freight allowed on orders of 10 gallons or more.

FULL-SIZED ILLUSTRATIONS AND FACE MEASUREMENTS

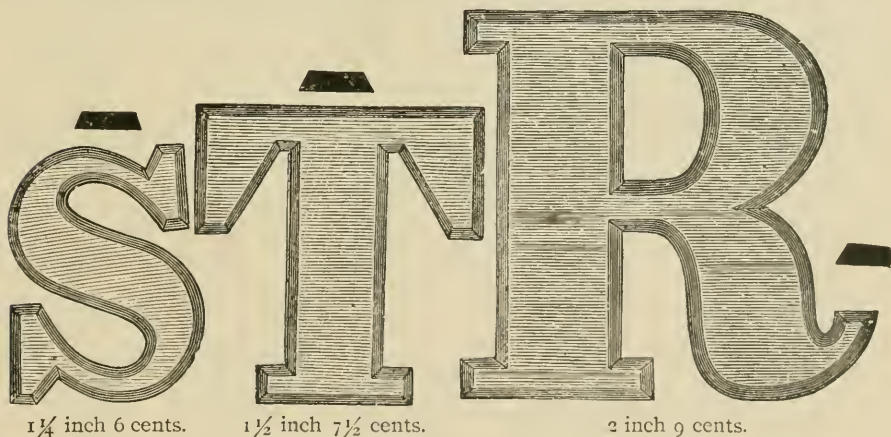
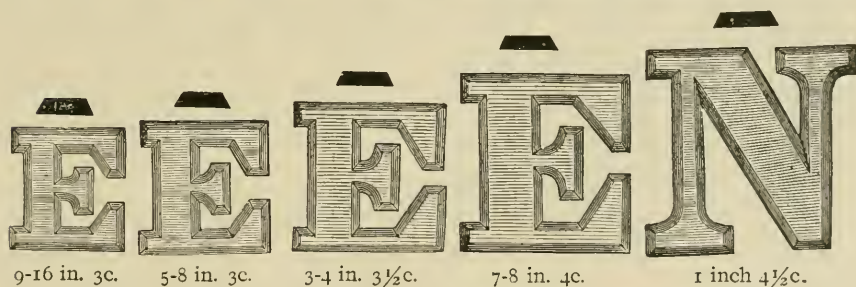
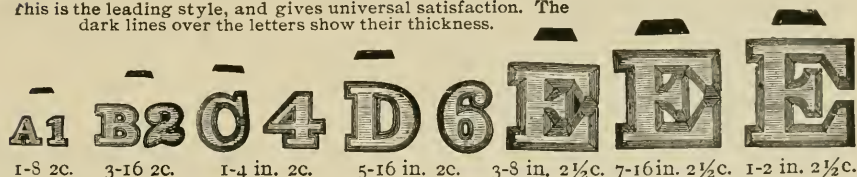
—OF METALLIC—

PATTERN LETTERS AND FIGURES,

For Foundrymen Machinists and Pattern Makers, to Put Inscriptions of Names,
Dates of Patents, Etc., on Patterns of Castings.

Greatest Variety in the United States.

ROMAN STYLE.

this is the leading style, and gives universal satisfaction. The
dark lines over the letters show their thickness.

Also 2½ inch 14 cts., 3 inch (heavy) 16 cts., 4 inch 30 cts., (5 inch 35 cts.
6 inch 40 cts., figures only). 1¾ 9 cts., 2⅝ inch Condensed Roman 14 cts.

NOTE.—The Roman Series is a universal favorite with Pattern Makers.

Extra Thin Roman 5-16, 3-8, 1-2, 5-8, 3-4 inch made to order, of about one-half
standard thickness.

2 inch Roman, double thickness, 12 cents each.

E

$\frac{7}{8}$ in., 4c.

SHARP FACE GOTHIC.

E E E E E E E E E

$\frac{7}{8}$ 2c. 3-16 2c. $\frac{1}{4}$ 2c. 5-16 2c. $\frac{3}{8}$ 2 $\frac{1}{2}$ c. $\frac{1}{2}$ in. 2 $\frac{1}{2}$ c. $\frac{5}{8}$ in. 3c. $\frac{3}{4}$ in. 3 $\frac{1}{2}$ c. 1 in. 5c.

Condensed Thin Roman.

E E E E

$\frac{3}{8}$ in. 2 $\frac{1}{2}$ c. $\frac{1}{2}$ in. 2 $\frac{1}{2}$ c. $\frac{5}{8}$ in. 3c. $\frac{7}{8}$ in. 4c.

This is a new and desirable style. It is more condensed and thinner than the regular Roman.

FLAT FACE GOTHIC.

THIN LETTER.

E E E E

$\frac{3}{8}$ in. 3 $\frac{1}{2}$ c. $\frac{7}{8}$ in. 4c. 1 in. 4 $\frac{1}{2}$ c.

FLAT FACE GOTHIC.

THIN LETTER.

N E N R E B E E E E

$\frac{1}{4}$ Cond. 2c.

3-16 2c. $\frac{1}{4}$ 2c. $\frac{3}{8}$ 2 $\frac{1}{2}$ c. $\frac{1}{2}$ 2 $\frac{1}{2}$ c. $\frac{5}{8}$ 3c. $\frac{3}{4}$ No. 3, 3 $\frac{1}{2}$ c. $\frac{3}{4}$ No. 2, 4c. $\frac{7}{8}$ No. 3, 4c. 1 No. 3, 4 $\frac{1}{2}$ c.

Treble Thick Gothic to order.

R

$\frac{7}{8}$ in. 3c.

ANTIQUE POINTED---NEW.

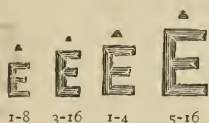
This is a new and desirable size for light ornamental work.

T E R B B E

$\frac{1}{2}$ in. 4c. $\frac{5}{8}$ in. 4c. $\frac{3}{4}$ in. 5c. $\frac{7}{8}$ in. 5c. 1 in. 6c. 1 $\frac{1}{4}$ in. 7c.

REDUCED PRICE LIST OF PATTERN LETTERS.

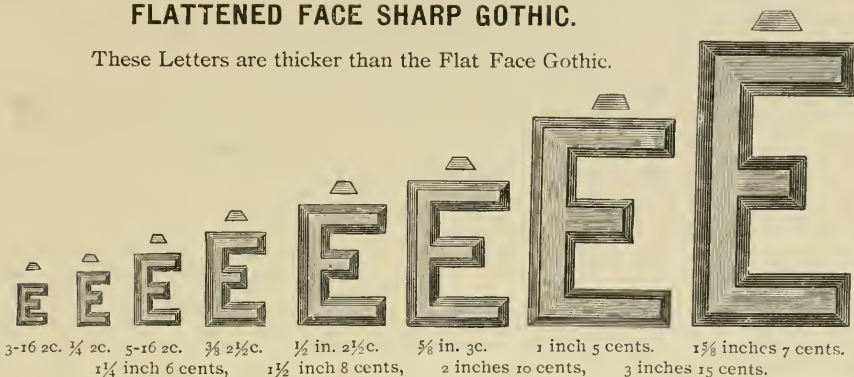
NEW STYLE HAIR LINE GOTHIC.



For Hollow Ware and Stove Manufacturers. They are a very light letter, but will make a sharp, clean print upon Hollow Ware or Stoves, where it is desired to have nearly a smooth surface. Price, same as other letters of corresponding sizes, 2 cents each.

FLATTENED FACE SHARP GOTHIC.

These Letters are thicker than the Flat Face Gothic.



REVERSED ROMAN BRANDING-IRON PATTERNS.

For Making Branding-Irons, Molds for Babbitt Metal, Brick Molds, etc., $\frac{3}{8}$ inch deep.



REVERSED GOTHIC BRANDING-IRON PATTERNS.

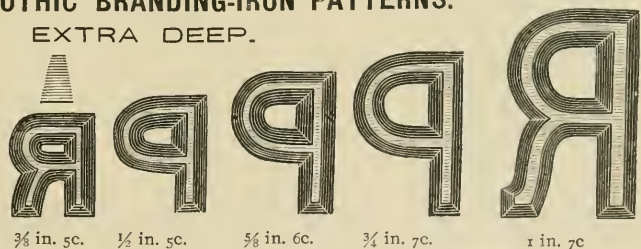
EXTRA DEEP.

HAIR LINE BRANDS.

1-8 inch 5 cents.

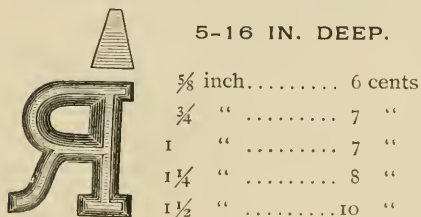
3-16 " 5 "

1-4 " 5 "



CONDENSED ROMAN BRANDING-IRON PATTERNS.—Reversed.

5-16 IN. DEEP.



SHARP FACE GOTHIC REVERSED.

For Putting in Molds of Artificial Stone Work.

7-16 in. 3 cts. $1\frac{1}{4}$ in. 8 cts. 2 in. 12 cts.
 $\frac{3}{4}$ in. 6 cts. $1\frac{1}{2}$ in. 10 cts. 3 in. 15 cts.

HEAVY FLAT GOTHIC REVERSED.

1 in. 8 cts. $1\frac{1}{4}$ in. 10 cts. $1\frac{1}{2}$ in. 12 cts.

ROMAN REVERSED.

$\frac{1}{4}$ inch 3 cents.

1 inch 7 cents.

BRASS PATTERN LETTERS AND FIGURES

Made Very Smooth.

**They May be Soldered, Riveted or Sweat on Iron
or Brass Patterns**

Made in all Sizes and Styles

Foundrymen, Investigate the Merits of Our Brass Letters

Harder and More Durable Than WHITE METAL

Sizes . .	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	& 4
Price . .	4c	4c	4c	4c	5c	5c	6c	7c	8c	9c	10c	12c	15c	18c	20c	30c

Special discounts in large lots. We will make any style shown on previous pages in BRASS when desired.

OBERMAYER'S BLOW PIPE OR TORCH

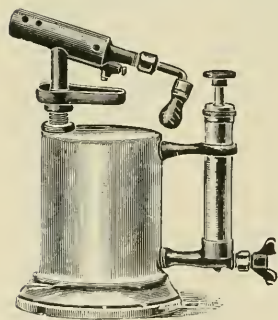


FIG. 55

For Dry Sand Molds

It can not be beaten as a handy torch, and it will give the best satisfaction in all classes of work that require the concentration of heat on a small mold.

This Torch is warranted after being carefully tested before leaving the factory.

Price, \$5.00

MOUTH BLOW CAN FOR SPRAYING WATER OR OTHER LIQUIDS ON THE MOLD

We carry these in stock and they are made in a substantial manner from either copper or tin, being about 2-in. in height and 4-in. in diameter. These are ordered frequently with Molders' Tools.

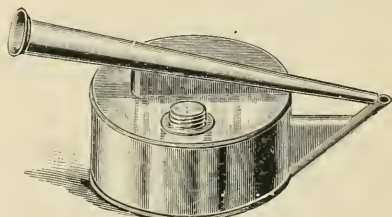


FIG. 56

MOLDERS' MALLETS



FIG. 57

Hard Wood Assorted Sizes

Price, \$2.50 per Dozen

Stock sizes, $1\frac{1}{2} \times 2\frac{1}{2}$, $2\frac{1}{2} \times 4$, 3×5 , 4×6 .

Molders' Combined Draw Hook and Rawhide Mallet

Plain Rubber Head Draw Hook



FIG. 58

Always carried in stock.

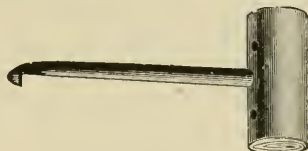


FIG. 59

These are made to fit loops, catches or holes in pattern.

Price, \$7.20 per dozen

Save Your Patterns by Using Rubber Head Mallets



FIG. 60

Made in Three Sizes

Small	$2\frac{7}{8}$	inches long	$\times$	$1\frac{3}{4}$	inch face,	\$1 00
Medium	$3\frac{3}{8}$	"	"	$\times$	$2\frac{1}{2}$ " "	1 25
Large	$4\frac{1}{8}$	"	"	$\times$	$2\frac{1}{4}$ " "	1 50

Other Sizes Made to Order

Rubber Mallets are especially valuable where light and thin castings are made, in that they do not break the patterns. Every tap of the mallet vibrates the pattern so that the sand does not stick to it.

MOLDERS' PATENT RAWHIDE MALLETS

List of Prices

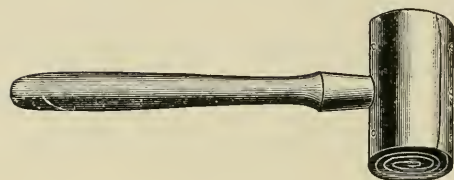


FIG. 62

No.	Diameter	Length.	Weight.	Per Doz.
0	1 in.	2 3/4 in.	1 1/2 oz.	\$ 3 20
1	1 1/4 "	2 3/4 "	3 1/2 "	4 20
2	1 1/2 "	3 "	6 "	4 80
3	1 3/4 "	3 1/8 "	7 1/2 "	5 60
4	2 "	3 1/4 "	10 "	7 20
5	2 3/4 "	4 1/4 "	21 "	18 50
6	2 3/4 "	4 3/4 "	22 "	20 00

These are light Mallets, made entirely of hide (except the handle) and suited to a variety of uses.

Rawhide, as a Mallet, is especially valuable where light and thin castings are made. They do not break the patterns. We respectfully call the attention of stove manufacturers to the advisability of adopting them.

LARGE FOUNDRY MAULS USED ON FLASKS FOR FLOOR WORK

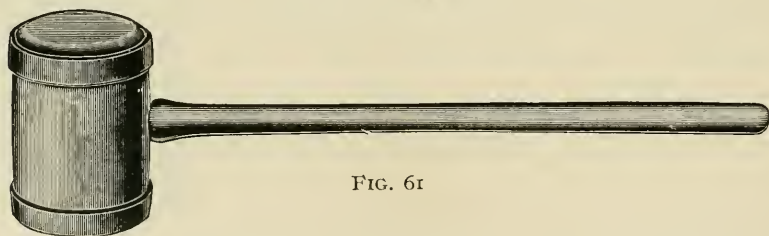


FIG. 61

These Mauls are made of exceptionally strong, well-seasoned wood, and when desired can be furnished at extra cost with an iron band on the ends to prevent the edges wearing away rapidly when in use. Size 6 x 9 with handles, length over all, 32-in.

Large size Foundry Mauls, as illustrated, at \$24.00 per doz.

We furnish small mallets which are used for large Core Boxes.

Size 4x6, made of Elm, with handles 10-in. clear of Maul at \$8.00 per doz.

RAWHIDE FACED MAULS

These Mauls, or Hammers, are invaluable for Molders, Machinists, Workers in Brass or Silver, Jewelry Manufacturers, or for any one who needs to strike a hard blow without bruising the material when he is at work.

When worn out, the faces can be renewed at slight cost. The old ones are easily removed by fastening the Maul in a vise, when a few blows on the side of the faces will usually knock them out. If worn down very much a cold chisel may be necessary. The new faces need no fastening except a tight fitting in the shell.

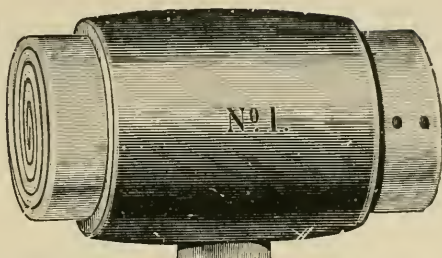


FIG. 63

List of Prices Without Extra Faces

No.	Weight.	Diameter of Face.	Price Per Dozen.	Extra Faces Per Dozen Pairs.
1	1 in.	1 1/4 in.	\$12 00	\$ 3 60
2	1 1/2 "	1 1/2 "	15 00	4 80
3	2 "	1 3/4 "	18 00	6 00
4	4 "	2 "	24 00	7 20
5	5 1/2 "	2 3/4 "	36 00	9 60

METAL WORKERS' SOAPSTONE CRAYONS

For Marking Iron Patterns or Castings



FIG. 64

The Following Sizes in Stock

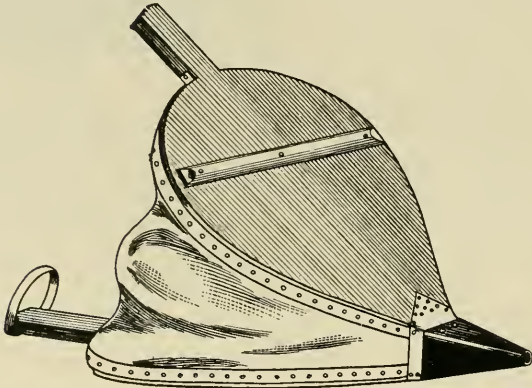
$\frac{3}{16} \times \frac{1}{2} \times 5$ } \$3.00 Per Gross, $\frac{3}{16} \times \frac{1}{4} \times 5$ } \$4.00 Per Gross,
 $\frac{1}{4} \times \frac{1}{2} \times 5$ }

Packed in 1 Gross Boxes.

A Great Success. Your Molders Want Them

OUR NEW IMPROVED MOLDERS' BELLOWS

With Sheet Steel Spout



PATENTED—FIG. 65

The new feature of this Bellows is the **Sheet Steel Spout**, which will neither mash, break nor rust, as the galvanized sheet iron pipes. This Sheet Steel Spout is nicely fitted on the Bellows Head, to which a **Strong Steel Hinge** is adjusted, and all are firmly riveted together.

This Bellows has *three thicknesses of leather* at the head (where Bellows usually first break or wear out). This doubly strengthens the Bellows where it is most needed, and makes it perfectly air tight at that point.

Notwithstanding the superior excellence of this Bellows, we have placed them on the market at the price of ordinary bellows, believing that the appreciation of foundrymen will be manifest in largely increased sales.

9 inch	\$12.00 per doz.
10 inch	14.00 "
12 inch	18.00 "

MOLDERS' FOUNDRY BELLOWS



FIG. 66

Molders' Ferruled Bellows

These Bellows are made especially for our own trade and are the strongest Molders' Bellows offered for foundry use. The Blow Pipe is set firm; is less liable to get out of place and at the same time is airtight. A ten-inch Ferruled Bellows is equal to an ordinary twelve-inch bellows. The leather is heavy, selected sheepskin. They have metallic hinges and a galvanized *iron spout*.

Prices according to size, from \$12.00 to \$21.00 per dozen.

Molders' Ordinary Bellows With Galvanized Spout

These are made with Blow Pipe fastened in the regular way. They are very good Bellows in every particular, and have a strong blast. Not quite as durable as Ferruled Bellows and don't cost as much.

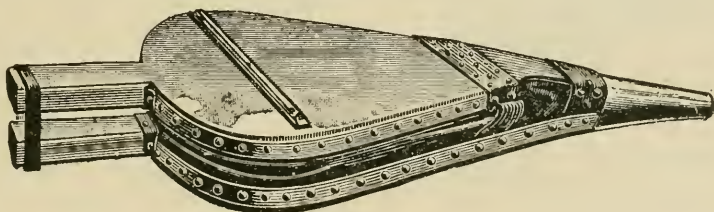


FIG. 67

8 inches	\$10 00 per doz.	12 inches	\$15 00 per doz.
9 "	11 00 " "	14 "	18 00 " "
10 "	12 00 " "		

Molders' Bench Bellows

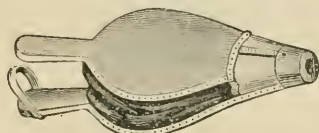


FIG. 68

Bench Bellows

These are a great convenience. No spout, but short, light and exceedingly strong and durable. Prices same as the above quotations.

We make Molders' Bellows which have horse hide, calf skin or any tough leather, when they are preferred, at special prices.

We manufacture our own Bellows. They are made to last.

Investigate Our BLACKSMITH BELLOWS

SPECIAL FOUNDRY BELLOWS

Obermayer's Facing Bellows

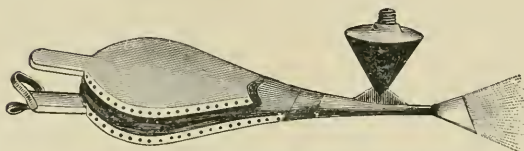


FIG. 69

For distributing Blacking upward and where it can not be applied with the dust bag. It is very favorably spoken of where used.

Price, \$3.25

Obermayer's Sprinkling Bellows

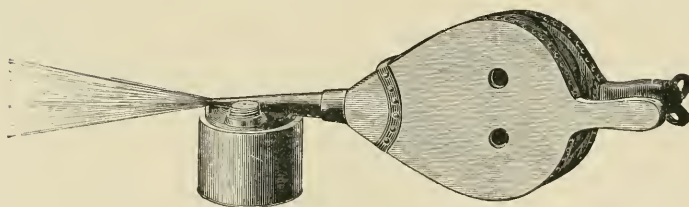


FIG. 70

For saturating the mold, when advantageous, with water, benzine, kerosene, etc.

Price, \$3.50 Each

These Bellows are of special value to Foundry men, especially so where Dry Sand Molds are made.

LARGE BELLOWS FOR FORGE OR BLACKSMITH WORK

Strictly First-Class High-Grade Bellows

English (Extra Long) Pattern

28 in	\$14 00
30 "	15 00
32 "	17 00
34 "	19 00
36 "	21 00
38 "	24 00
40 "	28 00
42 "	34 00
44 "	40 00
46 "	45 00
48 "	50 00
50 "	60 00
60 "	125 00

Opens Wide

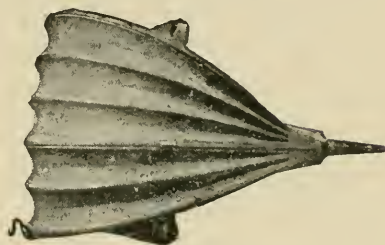


FIG. 71

Best Oak Tanned Leather

The above illustration shows the manner in which these are made, and you will notice they have five folds of leather, three in the top and two in the bottom. No other makes have this feature. We manufacture Hand Bellows (not molders), which are made of the very best leather.

Hand Bellows

6-inch	\$ 9.00 per doz.
7 "	10.00 "
8 "	11 00 "
9 "	13.00 "
10 "	15 00 "
12 "	20.00 "

**IF YOU GIVE THESE A TRIAL YOU WILL SEND US
DUPLICATE ORDERS**

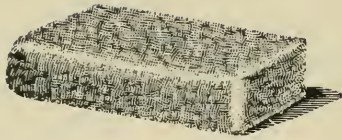


FIG. 72

EMERY OR VITRIFIED RUB STONES

For Cleaning or Producing a Very Smooth Surface on Castings

We carry the following sizes of Rub Stones in stock:

2 in. x 2 in. x 6 in	\$0 75 each
2 in. x 4 in. x 6 in	1 00 "
4 in. x 4 in. x 6 in	1 50 "
2 in. x 2 in. x 8 in	2 00 "
2 in. x 4 in. x 8 in	2 50 "
4 in. x 4 in. x 8 in	3 00 "

Draw Screws For Wood Patterns



FIG. 73

Small Size

\$1.50 per dozen

The Obermayer Dust Bag

\$2.50 per dozen



FIG. 74

Hardwood Wedges

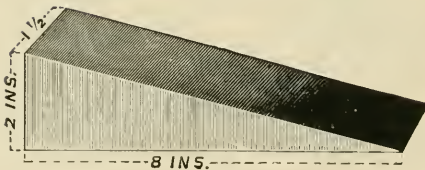


FIG. 75

\$2.00 per hundred

Iron Flask Pins, No. 2

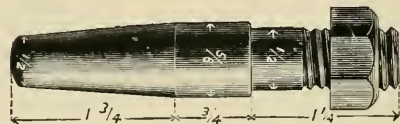


FIG. 76

\$16.00 per hundred

Cheaper than you can buy the lumber. Number in a barrel, 600.

Shipments made promptly by express or freight.

Write for Discounts



SUNDRIES

- | | |
|------------------------------------|-----------------------------------|
| Beeswax. | Clear White Pattern Glue. |
| Bayberry Wax. | Ticeolium. |
| Lump Pumice Stone. | Asbestos, Crude and Ground. |
| Ground Pumice Stone. | Stove Putty. |
| Portland Cement. | Annealing Charcoal, |
| Louisville Cement. | Charred Raw Bone Charcoal. |
| Plaster of Paris. | Pattern Makers' Supplies. |
| Annealing Carbon. | Case Hardening Raw Bone. |
| Draw Hooks | Parting Sand Riddles. |
| Lime. | Glutrose. |
| Core Nails. | Annealing Raw Bone. |
| Flue Brushes. | Borax. |
| Lycopodium. | Sulphur. |
| Noodle Glue. | Silica Sand. |
| Sparger's White Heat Steel Comp'd. | Emery Wheel Dressers and Cutters. |
| Annealed Core Wire. | Stove Cement. |
| Litharge. | Furnace Cement. |
| Tripoli, Powdered. | Aluminum Flux. |
| Arsenic. | Tin Parting Sand Dusters. |
| Pure Shellac Varnish. | Stove Bolts and Rods. |
| Caustic Soda. | Sand Grinding Machines. |
| Oil of Vitriol. | Pure Turkish Emery. |
| Baking Japan. | Sheet Mica. |
| Fire Sand. | Hydrofluoric Acid. |
| White Sand (for cores). | Burdick's Chaplets. |
| Sugar Sand. | Bone Black. |
| Hay Rope. | Wood Dowel Pins. |

FLOOR RAMMERS—COMPLETE

FIG. 77

\$15.00 per dozen

Hickory Handles only \$6.00 per doz.

Polished Iron Butts and Peans75 per set.

Brass Butts and Peans furnished when desired at extra cost.

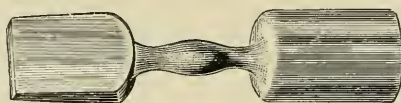
Molders' Hard Wood Bench Rammers

FIG. 78

Made From the Very Best Hard Wood, Well Seasoned and Oiled**READY FOR USE**

13 inches long, 4-inch butts 60 cents a pair.

Special sizes to order.

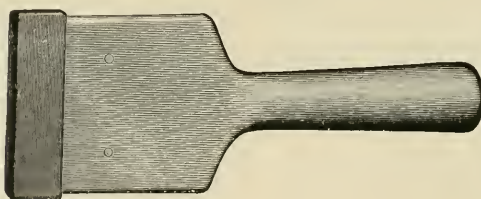
Rubber Tipped Floor Rammers

FIG. 79

We furnish RUBBER TIPPED FLOOR RAMMERS when desired.

Large size, 3 in. wide, $7\frac{3}{4}$ in. long; holds tip 3 in. wide, $1\frac{1}{8}$ in. thick and $\frac{3}{4}$ in. high.
 Small " 2 " $2\frac{3}{4}$ " " $2\frac{3}{8}$ " $1\frac{1}{8}$ " " $\frac{3}{4}$ "

Prices upon application.

FOUNDRY SPRINKLING CANS

Extra Heavy and Strong

These are made of Galvanized Iron; also of Copper, which have double bottoms, and are very strong. For foundries, etc.

Prices, Galvanized Iron, \$2.50 each; Copper, \$8.00 each. All sizes carried in stock.

Our Foundry Sprinkling Cans are built extra heavy to withstand the rough usage in the Foundry.

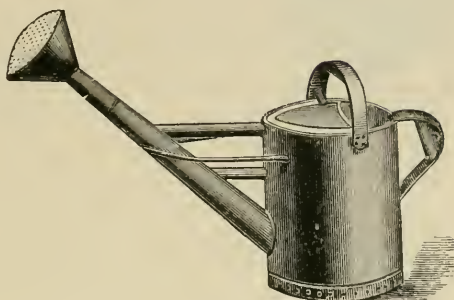


FIG. 80

FOUNDRY GALVANIZED BUCKETS

Made of Heavy Galvanized Material

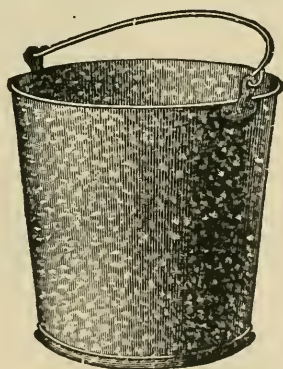


FIG. 81

Used in handling Clay Wash or Molasses Water.

Price, \$9.00 per dozen

Capacities from $2\frac{1}{2}$ to $3\frac{1}{2}$ gallons each.

Always carried in stock.

PATENT FOUNDRY BUCKETS

Made of Either Oak or Cedar Wood



FIG. 82

Extra Heavy and Strong.

Price, \$9.00 per dozen

Constructed to withstand the rough usage in a foundry.



FIG. 83

THE RELIABLE WALL TORCHES

**Our Torches Give a Bright, Clear
Flame, Almost Equal to an
Arc Light**

They are the best and simplest
Torches made for lighting Factories,
Foundries, Machine Shops, Blacksmith
Shops, Rolling Mills, Warehouses, etc.

They are made with both single
and double burners. Made for Kerosene
or Gasoline. In ordering state kind
desired.

Single Burner, \$3.00 each.

Double Burner, 4.50 each.



FIG. 84—No. 1

HAND TORCH LAMPS

Made For Rough Usage



FIG. 85—No. 2

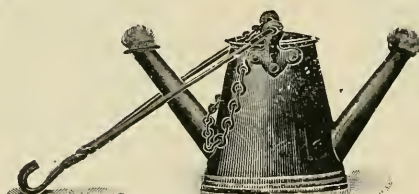


FIG. 86—No. 3

No. 1	\$0 75 each
No. 2	1 00 each
No. 3	1 25 each

Made from Sheet Steel, Brazed with hard Spelter Solder.

These goods are practically indestructible.

OBERMAYER FOUNDRY BROOMS



FIG. 87

These Brooms are made of heavy steel bands or heads which are securely nailed together. By this method of construction it is impossible for the brooms to work loose or the handles on the material to fall out.

No. 1. Corn and Japanese Fiber mixed,
35 lb. per doz., at. \$8.00 per doz.

No. 2. Corn and Rattan Fiber mixed,
35 lb. per doz., at. \$8.00 per doz.

No. 0. All Japanese Fiber,
33 lb. per doz., at. \$8.00 per doz.

No. 1. All Japanese Fiber,
39 lb. per doz., at. \$9.00 per doz.

They are adapted for all kinds of heavy and light sweepings. They will last longer and give better service than any ordinary wire wound broom. No shoulders to break or tear when sweeping around machinery. The brooms keep their shape till entirely worn out. They are useful for Factories, Iron and Steel Mills, Foundries, Warehouses, Railroads, Packing Houses, Stables, and wherever rough service is required.

CORN WHISKS

These are sometimes used by Foundries and Machine Shops for bench use.

No. 1 at \$3.00 per doz.

No. 2 at \$3.50 per doz.

No. 3 at \$4.00 per doz.

No. 4 is made heavy and extra strong for shop use at \$3.50 per doz.

Prices subject to discount.

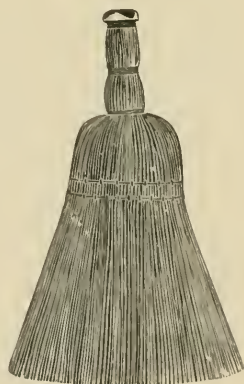


FIG. 88

MOLDERS' SHOVELS

Our Own Brands and Those of Leading Shovel Manufacturers



FIG. 89

"Split" Handle

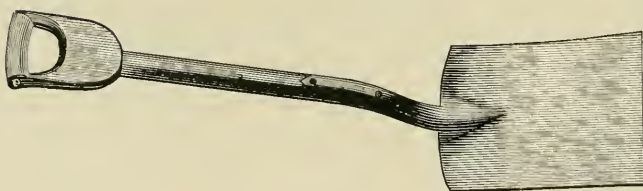


FIG. 90

"D" Handle

Different Brands and Descriptions

Our Molder's Shovels are the best. We offer you a larger variety than any other concern.

We call your particular attention to our **"Obermayer"** and **"Peerless"** Brands, which we guarantee to be second to none.

When ordering, specify whether "Split" or "D" handle is wanted.

Prices and Brands

Ames	\$16.50 per doz.	Obermayer	\$13.50 per doz.
Blair	14.00 "	Peerless	12.50 "
Tredwell	12.50 "	Justis	8.40 "
Hadwin	11.80 "	Eagle	6.50 "

We carry an immense stock of different Brands of Molders Shovels at our various warehouses.

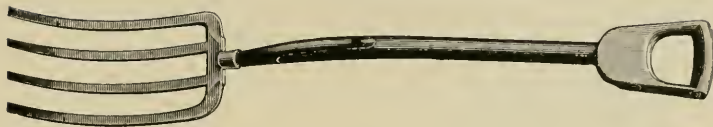
“ OBERMAYER ” GATE RAKES

FIG. 91

No. 1 (four prong) \$12.00 per doz.



FIG. 92

No. 2 (eight prong) \$18.00 per doz.

“ OBERMAYER ” COKE FORKS

Sizes From 10 to 16 Tine

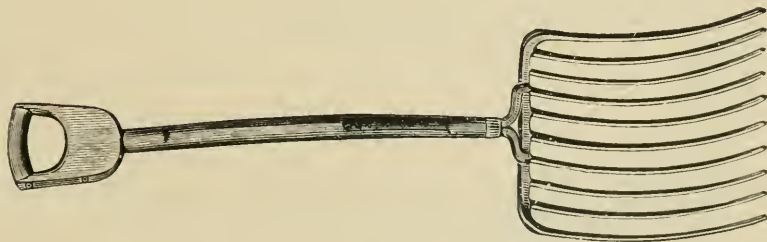


FIG. 93

From \$3.00 to \$3.75 each, according to size.

All sizes always carried in stock for immediate shipment.

“ OBERMAYER’S ” COAL, COKE SHOVELS AND SCOOPS

Plain Black Polished Lipped Shovels



FIG. 94

“ D ” Handle

From \$7.50 to \$15.00 per doz.

Coal or Coke Shovels

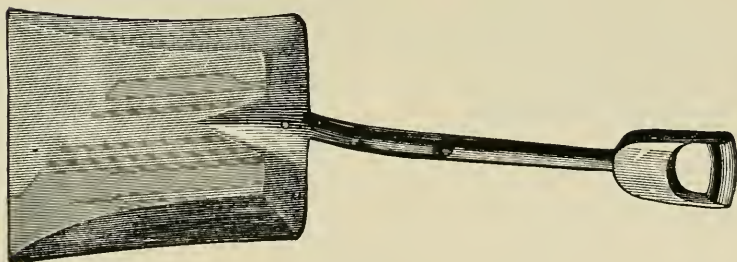


FIG. 95

“ D ” Handle

From \$12.00 to \$20.00 per doz.

Obermayer Scoops

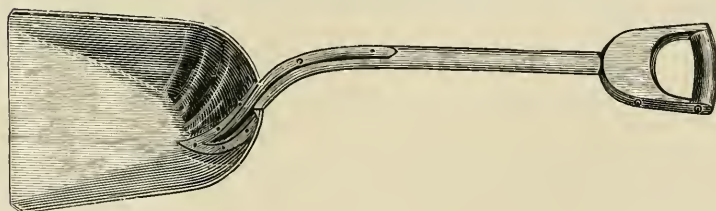


FIG. 96

From \$8.00 to \$21.00 per doz.

Large assortment always carried in stock for immediate shipment.

MOLDERS' EXTRA HEAVY STEEL, GALVANIZED AND BRASS RIDDLES

Obermayer's Riddles are Guaranteed to be the Heaviest, Strongest and to Withstand the Roughest Usage. Cross Bars are Equalized on the Bottom.



FIG. 97



FIG. 98

Steel Wire Riddles

18-inch Foundry Riddles, from No. 2 to No. 12 mesh . . \$6.00 per doz.

Galvanized Wire Riddles

18-inch Foundry Riddles, from No. 2 to No. 12 mesh . . \$8.50 per doz.

Brass Wire Riddles

18-inch Foundry Riddles, from No. 2 to No. 18 mesh . . \$12.50 per doz.

Brass Parting Sand Riddles

18-inch from No. 20 to No. 26 \$3.00 each

Extra Fine Brass Riddles for Rosin, etc.

From No. 28 to No. 100 \$4.50 each

We carry all Riddles in stock, both with or without cross bars. All kinds made to order.

Special Sizes Made to Order

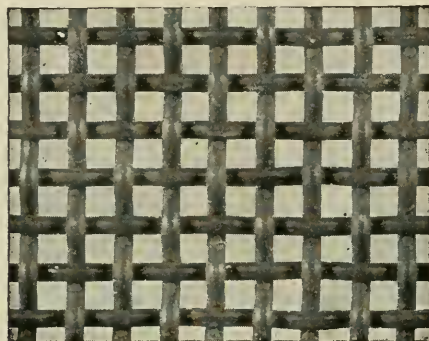
DOUBLE CRIMPED WIRE CLOTH**Exact Size of Mesh**

FIG. 99

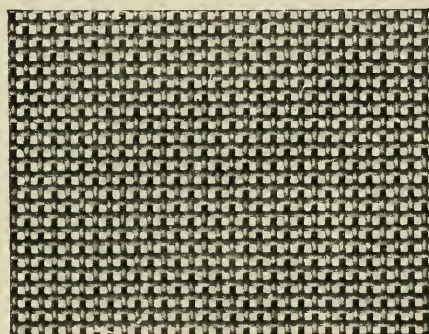
4 Mesh. No. 11 Wire

FIG. 100

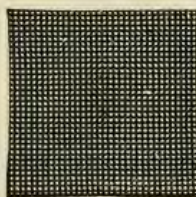
12 Mesh. No. 18 Wire

FIG. 101

40 Mesh. No. 30 Wire

We invoice at Lowest Market Price at time of Receiving order.
Steel and Brass Wire Cloth of all kinds carried in stock.

THE OBERMAYER SCRAP IRON RIDDLES

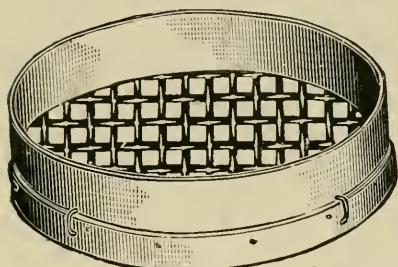


FIG. 102

Extra Heavy Riddles, $\frac{3}{4}$ to $1\frac{1}{2}$ -in. Mesh, \$18.00 per doz.

The Obermayer Riddles are made with heavy oak hoops 18 inches, 20 inches and 22 inches in diameter. They may be used for screening coal or for small castings, cinders, etc., in foundries.

WIRE COKE BASKETS

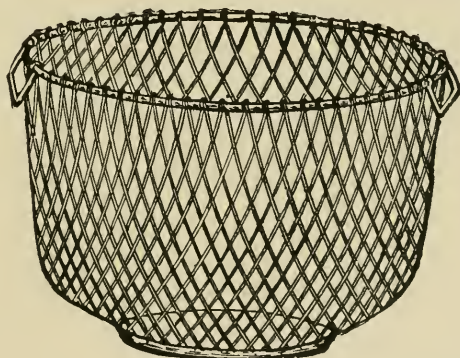


FIG. 103

They are made of extra heavy crimped Galvanized Steel Wire firmly put together, and make a strong, durable basket.

We carry two sizes in stock:

No. 1 holds 60 pounds or 1 bushel \$4.50

No. 2 holds 120 pounds or 2 bushels 5.50

These baskets are better and cheaper than wooden baskets to handle coke or charcoal. Special large coke baskets for crane service made to order.

HIGH GRADE GALVANIZED STEEL BASKETS

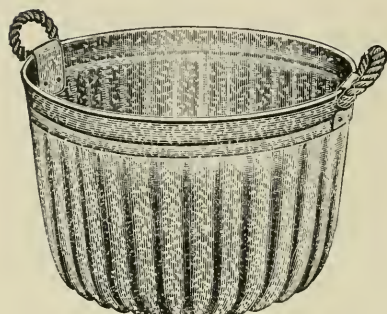


FIG. 104

Complete Double Bottom**Strong, Durable, Light Weight**

No.	Bush'ls	Diam.	Depth.	Weight	Price Per Doz.
1	1	17	11 1/2	6	\$18 00
1 1/2	1 1/2	19	13	7	22 50
2	2	20	16	8	27 00
3	3	23	17	10	36 00
4	4	25	20	12	45 00
5	5	25	24	14	54 00
6	6	27	27	16	63 00
101	1	15	17	6	18 00
102	1 1/2	15	22	8	22 50
103	2	15	28	9	30 00
106	1 1/2	17	17	7	22 50
107	2	17	21	9	27 00
108	2 1/2	17	27	11	36 00
111	2 1/2	20	17	9	31 50
112	3	20	21	11	36 00
113	4	20	27	13	45 00

Rope, Iron or Clip Handles, as you like. Specify which, otherwise we send *Iron*.

Extras

Add for	Wire Mesh Bottoms	\$ 6.00	per doz.
" "	Shoes or Runners	6.00	" "
" "	Casters	\$6.00 to 24.00	" "
" "	Covers	30	per cent
" "	Heavy Tin Plate	50	" "

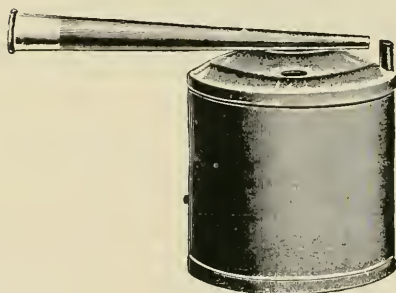
MOLDERS' SPRAY CANS

FIG. 105

For spraying water or other liquids on the mold. Made substantially from either Brass or Enamelled Tin.

Smaller size in Copper or Tin of other design.

Price, Brass, \$1.50 each. Tin, 75c each.

STEEL WIRE SAND SCREENS

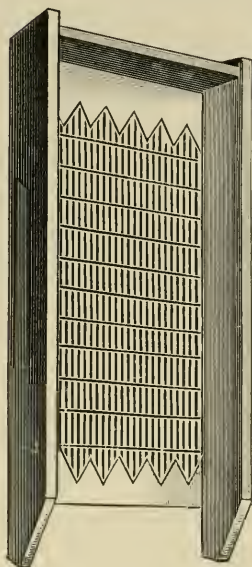


FIG. 106

Double Wires

The above Screen is made from Selected Steel Wire, extra laced with DOUBLE WIRES instead of single. The frames painted and the wires coated to prevent rusting.

The regular size for Foundry use is 4 Mesh, for fine sand 5 Mesh, and for gravel 3 Mesh.

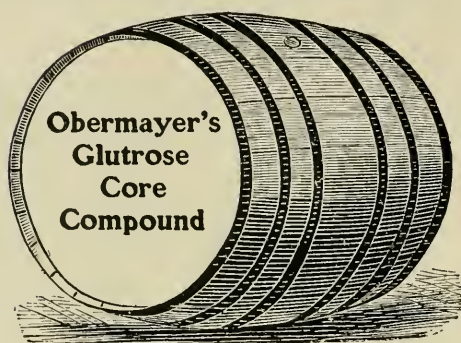
No. 1 Steel Wire Sand Screen

Size, 6 feet high, 28 inches wide \$10.00 each

No. 2 Steel Wire Sand Screen

Size, 5 feet high, 24 inches wide \$ 9.00 each

Special Steel Wire Screens to order.



GLUTROSE (LIQUID) CORE COMPOUND

Sold on Quality, Retained on Merit

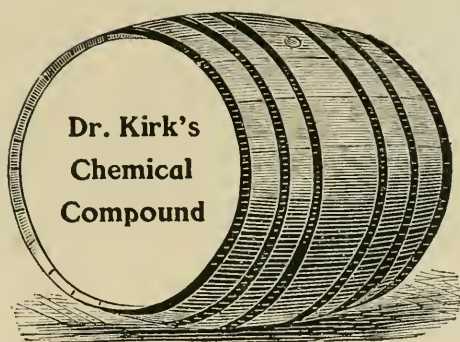
Glutrose Core Compound is an article made in liquid form, to be mixed with the sand. This mixture is diluted by the use of water to the consistency desired, then the sand is tempered according to the size of the core.

Cores can be made to have a hard outer surface so the thin places and corners may be kept sharp and strong.

No Gases are Generated

thus preventing blow holes in your castings. We manufacture several grades which are intended for general foundry use—one grade for small, fine cores, especially valuable for brass work; also a grade for radiator work, where a strong, slender, tough core is required. SAVES TIME, SAVES MONEY and SAVES TROUBLE. It has a heavier body than any Liquid Core Compound on the market. Diluted and used often as a substitute for molasses water. A trial will convince you. Always in stock.

Prices on application.



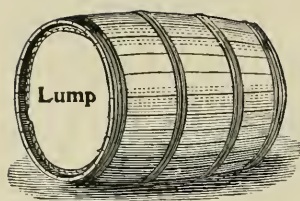
DR. KIRK'S CHEMICAL COMPOUND OR FLUX

For Cleaning, Softening and Strengthening Cast Iron When Melting in a Cupola

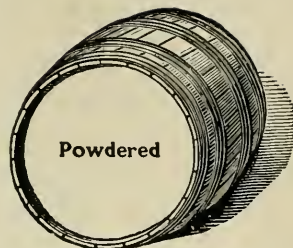
This Compound is designed to supply Carbon, which is a strong element that is desired in producing good castings. In the process of manufacture, where fluidity in melting is essential, this flux, when used, will make a good, strong casting. This Compound will assist in making hard iron soft. It will reduce percentage of loss; it will reduce tendency to clinging to lining, and it will facilitate escaping of dirt and dross from the iron. It will assist the lining in being glazed, thus cleansing the Cupola and makes the slag brittle and easily removes it.

Directions

Use about five pounds to each ton of iron melted; make into a thick paste and distribute equally upon each charge of fuel before you add the charge of iron. This compound should be used dry before tapping when placed in the bottom of ladles.



FERRO MANGANESE



We can furnish 80 per cent pure Ferro Manganese in LUMP or POWDERED form in carloads or less.

Ferro Manganese is one of nature's own remedies, and has been used in the iron industry for many years. It strengthens the iron; it prevents blow holes, and otherwise improves the iron. When used in very small proportions it acts to soften the chill. Used in larger proportions, say 1 per cent, it acts to strengthen soft iron. It aids the escape of gases, thus reducing the chances of blow holes or unsound castings. It assists wonderfully in eliminating sulphur in coke or iron when it is melting in the Cupola.

With the use of FERRO MANGANESE you can safely use more scrap iron in your mixtures. When using FERRO MANGANESE for chilling or softening iron, there is a general improvement of the iron in solidity, toughness, etc., and after a little experimenting it will prove to you that FERRO MANGANESE is a valuable adjunct in your foundry for nearly all classes of castings.

The most economical way to use FERRO MANGANESE is to put it at the bottom of the ladle. It may be used in lump form in the Cupola. When placed in the tapping spout in running metal it will mix thoroughly. You should use one pound of ground FERRO MANGANESE IN LADLES to about 400 pounds of iron. If this does not produce the results required, experiment a little, using more or less FERRO MANGANESE, as your case may require, and in a short time you will fully realize the benefits of this material.

Lump

In small lots of 25 lbs.	10	cents per lb.
In lots of 200 lbs.	7	" "
In ton lots.	4½	" "

Powdered

In small lots of 25 lbs.	15	cents per lb.
In lots of 200 lbs.	12½	" "
In ton lots.	8	" "

F. O. B. Factory.

THOMPSON'S ADJUSTABLE FLASK CLAMPS

Prevent Run-Outs by Using the Best Flask Clamp

Thousands in Daily Use—Send for a List of Users

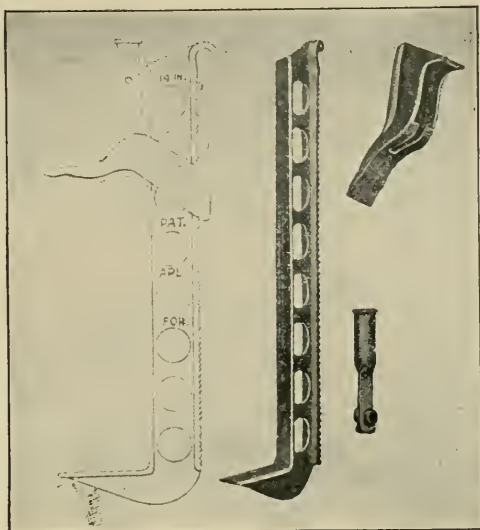


FIG. 107

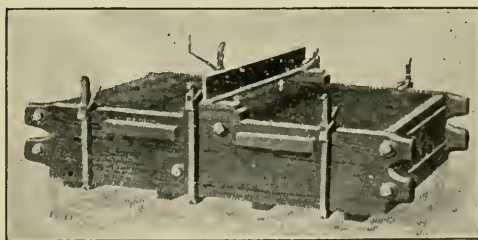


FIG. 108

This Cut Shows Clamp in Use

These Clamps will not only save time, but do away with wooden wedges. They are the most practical and economical flask clamps on the market. It is not necessary to have a great variety of sizes. The following sizes carried in stock.

No. 1.	10-inch . .	\$ 9.60 per doz.	No. 5.	30 inch . .	\$20.40 per doz.
" 2.	14 " . .	12.00	" 6.	36 " . .	24.00
" 3.	18 " . .	14.40	" 7.	42 " . .	31.20
" 4.	24 " . .	16.80			

It is to your interest to order a trial lot.

ECCENTRIC CLAMPS

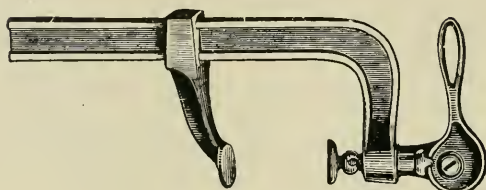


FIG. 109

Has Advantages Over the Ordinary Screw Clamp. A Time and Labor Saving Instrument.

Nos	0	1	2	3	4
Open, inches . .	2 $\frac{1}{4}$	4	6	8	12
Price	\$4.00	\$6.00	\$7.50	\$11.00	\$13.00 per doz.

MALLEABLE IRON SCREW CLAMPS

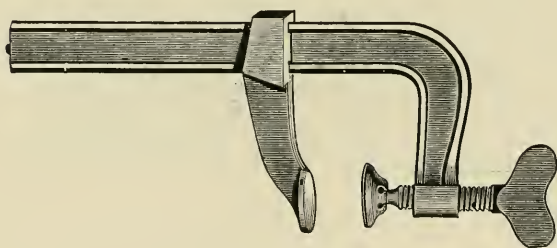


FIG. 110

Nos.	1	2	3
Open, inches . .	4	6	8
Price	\$6.00	\$7.50	\$11.00 per doz.

CABINET MAKERS' AND BUILDERS' STEEL BAR CLAMPS

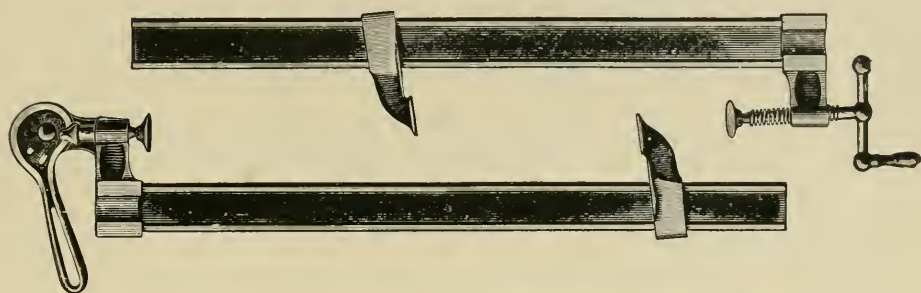


FIG. III

12 inches . . \$13.00 per doz.	48 inches . . \$26.00 per doz.
15 " . . 13.75 "	54 " . . 28.00 "
18 " . . 15.00 "	60 " . . 30.75 "
21 " . . 16.00 "	66 " . . 32.50 "
24 " . . 17.25 "	72 " . . 34.75 "
30 " . . 19.50 "	78 " . . 37.00 "
36 " . . 21.75 "	84 " . . 39.00 "
42 " . . 23.85 "	90 " . . 41.50 "

The increased demand for long Clamps by manufacturers of cabinet and undertakers' goods is fully met by this Clamp. No clamp made equals it in strength, convenience and ease of adjustment. It clamps instantly any width of work up to eight feet. Any odd size made to order. We make this Clamp with a screw head in place of the eccentric head, when so ordered.

The Only Steel Bar Clamp Made

WOOD DOWEL PINS

Prices on Maple, Hickory, Ash or Oak Rods

$\frac{1}{4}$ inch . . . \$4.50 per 1,000 ft.	$\frac{9}{16}$ " . . . \$6.50 per 1,000 ft.
$\frac{5}{16}$ " . . . 4.50 "	$\frac{5}{8}$ " . . . 7.00 "
$\frac{3}{8}$ " . . . 5.00 "	$\frac{11}{16}$ " . . . 8.00 "
$\frac{7}{16}$ " . . . 5.30 "	$\frac{3}{4}$ " . . . 10.00 "
$\frac{1}{2}$ " . . . 5.60 "	

“ESSO” SCREW CLAMPS

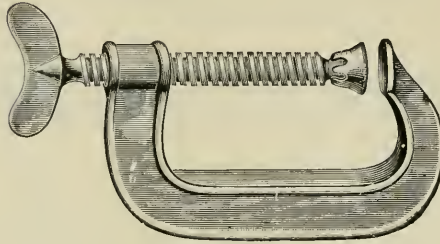


FIG. 112

With Ball and Socket Swivel

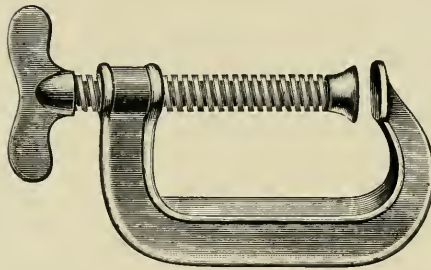


FIG. 113

With Riveted Swivel

Heavy Square Thread on Screws. Frames “Ribbed” all around.
The Strongest and Best Clamps made.

To Open, inches	2	2½	3	4	5	6
Price	\$4.00	\$5.20	\$6.00	\$8.40	10.00	\$13.00 per doz.
To Open, inches.	7	8	9	10	12	
Price	\$15.60	\$18.00	\$20.00	\$22.00	\$27.00 per doz	

In Ordering, Please State Which Style Swivel is Desired

From 2 to 6 inch, half doz. in box.
From 7 to 12 inch, quarter doz. in box.

Cabinet Makers’ Clamps in stock ; large assortments.

HAWLEY'S PATENT ADJUSTABLE CLAMP



FIG. 114

These Clamps are made from the best malleable iron and are so constructed that they can be adjusted instantly to any size flask within the length of the Clamp. Each Clamp will take the place of five to ten plain, old style clamps. They are strong, comparatively light and durable.

No. 1	adjusts from	7½-in.	to 11-in.	Flask .	\$ 6.00	per doz.
" 2	"	9	" to 14	"	. 7.50	"
" 3	"	13½	" to 24	"	. 18.00	"

PINCH DOGS



FIG. 115

No. 00	1½-in.		30 cents per doz.
" 0	2	"	40 " "
" 1	2½	"	50 " "
" 2	3	"	70 " "

ECONOMIC SEAMLESS STEEL CAN



FIG. 116

For Shellac, Paint,
Varnish, etc

**The Hermetical Seal Pre-
serves Brushes and
Contents**

This can is made from smooth surface, cold-rolled "Swedoh" steel, drawn seamless, in two parts. It is well finished and heavily enameled outside, the interior being coated with a light varnish that will not discolor the material kept in the can.

It commends itself at once to pattern and cabinet makers and all who use fine paints, varnish, shellac, etc.

Size of "Economic Can" 9½ inches high, 6 inches in diameter.

\$3.00 each

THE EUREKA SNAP FLASK

The Most Perfect Acting and Reliable Flask Upon the Market. Cheap in Price and Always Ready

Hardwood—Malleable Iron Trimmings

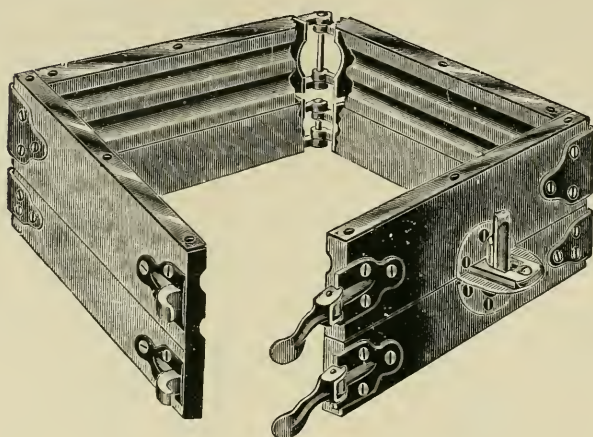


FIG. 117

The placing upon the market of a ready-made Snap Flask is an article as new as it is needed, and we are determined to give Foundrymen a chance to get the best constructed, the best acting and most durable Snap Flask at a price that will be a great saving over the old way of making them for themselves, and, besides, getting a superior article. It can be seen by the cut that the flask has the most perfect acting hinge. It is so constructed that the sand can not get into it, and does not have to be cleaned every time it is taken off the mold, nor will it break or crack the mold in taking it off. It has an adjustable guide, which can be adjusted to the pins very quickly. The pins are V-shaped, with corresponding bearings on the adjustable guide, which insures a square and perfect lift of the cope. This flask is bound on both edges with heavy band iron. The corners are all rabbeted together and bound with heavy corner irons, which makes them stiff and strong. The hook is the simplest and most perfect in action of any hook made, and when closed holds the flask perfectly tight and stiff.

The cope is grooved all the way around so as to prevent any sag in lifting off or closing up. This flask complete cannot be equalled in quality for the price.

Price \$6.00 Each, Any Size

Snap Flask Trimmings \$3.00 Per Set

EUREKA ROUND SNAP FLASK

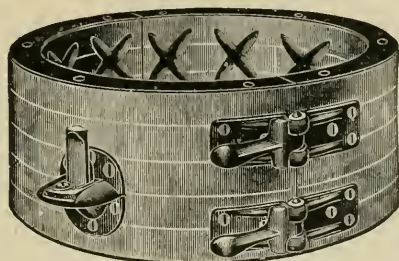


FIG. 118

We illustrate our Eureka Round Snap Flask, which fills a long-felt want in the Foundry. They are $1\frac{1}{4}$ inches thick. They have our patent hooks. The edges are bound with heavy band iron, and have our latest improved adjustable guides and pins. The cope is grooved, and is made to stand a great deal of rough usage. It works perfectly.

Price, \$10.00 Each

EUREKA SPECIAL CUT SNAP FLASK

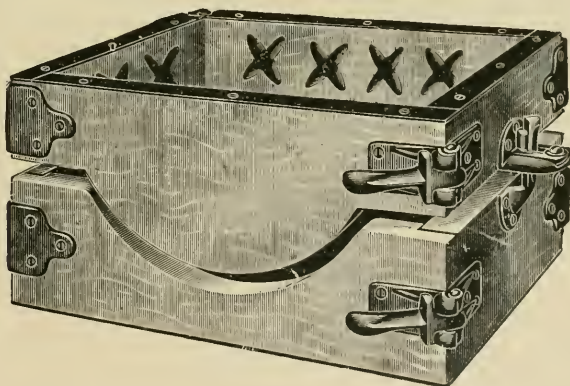


FIG. 119

The above cut illustrates the Eureka Snap Flask, cut for a special pattern.

We make this Flask *cut* in any shape.

In ordering, send drawing of the sides of the Flask as it is to be cut to fit the pattern, or send pattern.

Use Our Taper Snap Flask

THE STANDARD TAPER SNAP FLASK

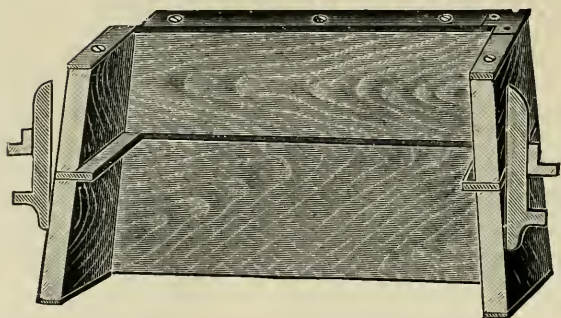


FIG 120

All Measurements Given at the Parting (Flasks Taper 1 inch to 1 ft.)

FOR EXAMPLE: A flask 12 x 12 inches, 6-inch cope and 6-inch drag, would measure 13 x 13 inches at the bottom, 12 x 12 inches at the parting, and 11 x 11 inches at the top. They are made with special machinery and built on templets, and the taper is perfect. Therefore, in ordering, if you are going to use wood slip-boxes, we would prefer to cut them out for you, and when nailed together we will guarantee them to fit perfectly on all four (4) sides. Instead of grooves we use band iron for holding the sand in cope, as shown in cut. For any special casting, which has to be perfect, there is no better flask in which to make it than these, if you have perfect slip-boxes.

They do not crush the mold.

Band Iron, extra	\$2 00
Price for cutting slip-boxes, each	50
List Price for Taper Flask complete, each	10 00

Write For Discount

R U a User of Obermayer's Facings?

NEW DIAMOND SNAP FLASK

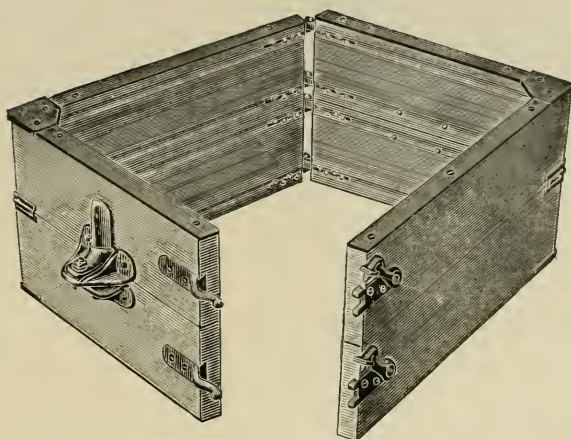


FIG. 121

The New Diamond Snap Flask is furnished of the very best material, with malleable iron trimmings mortised and dovetailed into the wood. The pins and sockets are placed on with bolts, and the hinges are warranted not to get loose from the wood. On each flask is one adjustable socket to take up the wear.

The New Diamond Snap Flask is the lightest, strongest, and best flask on the market. It suits the majority of molders, for both bench and machine work. This flask is guaranteed to be perfect in every respect.

Sets of Five.—We call special attention to a set of five Snap Flasks of any size, length and width, which consists of five drags, each 2, 3, 4, 5 and 6 inches, and of five copes the same. They are interchangeable, and the following twenty-five depths of Flasks may be made of one set.

Copes	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4
Drags	6	5	4	3	2	6	5	4	3	2	6	5	4	3	2
Copes	5	5	5	5	5	6	6	6	6	6					
Drags	6	5	4	3	2	6	5	4	3	2					

These sets are used for odd jobs, as they do away with the nailing on of strips to suit the work.

Price for single Diamond Snap Flask (cope and drag) . . . \$6.00

Price of sets of five is \$27.50.

Match and cheeks made when desired. Price, \$2.50 each.

Prompt Shipments

OBERMAYER CORE BOXES

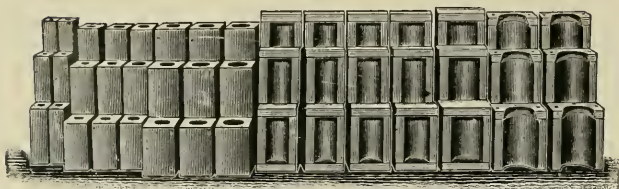


FIG. 122

We furnish a complete set of Core Boxes which consists of fourteen sizes and three lengths to each size, viz.: 6 in., 12 in., and 16 in. long, making in all 42 boxes.

Straight ends \$40.00 per set

Cone end extra 10.00 "

List of Standard Cores

Diam. of Core.	To Bore	Diam. of Core.	To Bore
$\frac{7}{8}$	$1\frac{3}{16}$	$1\frac{7}{8}$	$2\frac{3}{16}$
$1\frac{1}{8}$	$1\frac{7}{16}$	$2\frac{1}{8}$	$2\frac{7}{16}$
$1\frac{3}{8}$	$1\frac{11}{16}$	$2\frac{3}{8}$	$2\frac{11}{16}$
$1\frac{5}{8}$	$1\frac{15}{16}$	$2\frac{5}{8}$	$2\frac{15}{16}$

Diam. of Core.	To Bore	Diam. of Core.	To Bore
$2\frac{7}{8}$	$3\frac{3}{16}$	$3\frac{5}{8}$	$3\frac{15}{16}$
$3\frac{1}{8}$	$3\frac{7}{16}$	$3\frac{7}{8}$	$4\frac{3}{16}$
$3\frac{3}{8}$	$3\frac{11}{16}$	$4\frac{1}{8}$	$4\frac{7}{16}$

They are made of hard poplar, which is not likely to warp as maple wood does when used continually with the wet sand.

Core Boxes made in any size and sold in any quantity desired.

ANNEALED CORE WIRE

We furnish to the trade Annealed Iron Wire in bundles, and carry in stock assorted sizes, from No. 8 to No. 16, standard wire gauge. Other sizes furnished when ordered.

We always ship this in bundles unless otherwise specified, without making extra charges, the average weight being from 100 to 150 lbs. each bundle.

No.		
8		.162
9		.148
10		.135
11		.120
12		.105
13		.092
14		.089
15		.072
16		.063

FIG. 123

Decimal Figures refer to Diameter in Decimal Parts of an Inch

Investigate Our Core Wire Straightening Machines



FIG. 124

MOLDERS' TOOLS



FIG. 125

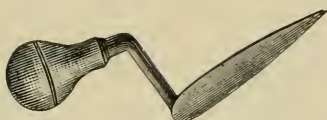


FIG. 126

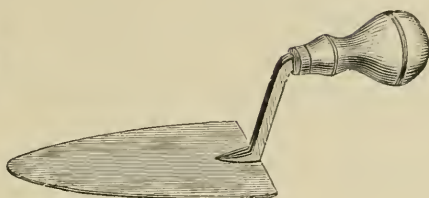


FIG. 127

ALL KINDS, SIZES AND MAKES CARRIED IN STOCK
FOR IMMEDIATE SHIPMENT

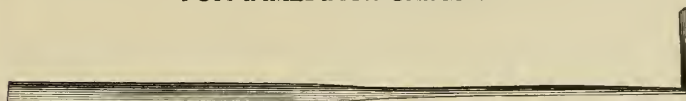


FIG. 128

All Molders' Tools sent by express or mail with
charges prepaid.



FIG.
129



FIG.
130



FIG. 131

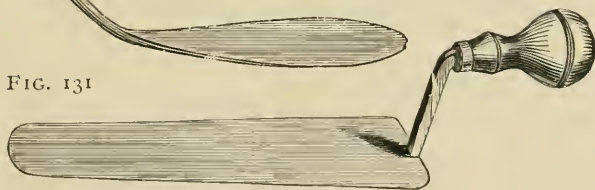


FIG. 132

SEND FOR SPECIAL MOLDERS' COMPLETE TOOL CATALOGUE, which
we send to any individual molder FREE OF COST.



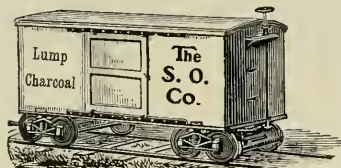
FIG. 133



FIG. 134

LUMP CHARCOAL

Carloads or Less



We are prepared to furnish at all times Charcoal used by foundries for skin drying molds and other purposes. We operate our own Charcoal Kilns and burn nothing but Hard Wood. Less than carload lots put up in barrels. Shipped in Bulk in carloads to all parts of the United States and Canada.

NOTICE

We desire to call the attention of the trade to the fact that we furnish all kinds of **Willow, Maple and Pine Charcoal** and carry this material in stock; **Charcoal for Animal Food, Veterinary and Medicinal** purposes. We furnish **Charcoal** for every purpose known, in **lump, granulated or powdered form.**

FOUNDRY COKE



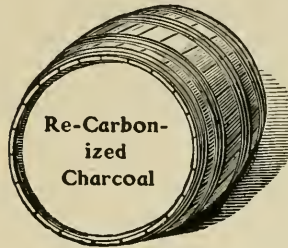
We ship genuine 72-hour Connellsville Foundry Coke at lowest market prices. We have made arrangements to secure for the foundrymen the best Connellsville Coke.

Carloads shipped direct from the Coke Ovens. Less than carloads shipped from our nearest warehouse.

Write for prices and freight rates.

RE-CARBONIZED GRANULATED WOOD CHARCOAL

For Filtering Purposes



We are furnishing this material to the builders of refrigerating plants, also to the manufacturers of Artificial Ice.

Our Granulated Charcoal is pure and sweet, and free from all foreign matter, being used for all filtering purposes; it is manufactured from *simple burnt hardwood Charcoal*.

This *granulated* wood Charcoal is suitable for purifying water, whether used in the manufacture of Ice or not.

Put up in bags or barrels; 3 cents per pound.

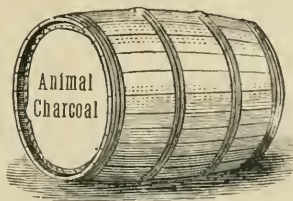
Special prices in car loads.

Special prices to dealers and Ice Machine builders.

Order from our nearest Warehouse.

Notice

Our filtering Charcoals are made from hard wood—*Maple*—and made under our own supervision.



We Are Manufacturers of Granulated Animal Charcoal for Filtering, etc.

Wrought Iron Chaplets and Chaplet Stems.

WROUGHT IRON CHAPLETS, WITH FORGED HEADS.
PRICE PER HUNDRED.

DIAMETER OF HEAD.	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2
	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
DIAMETER OF STEM.								
Length.								
3 inches.	\$1 55	\$1 83	\$2 10	\$3 53	\$5 33	\$5 33		
3½ "	1 60	1 90	2 20	3 70	5 60			
4 "	1 65	1 97	2 30	3 87	5 87			
4½ "	1 70	2 05	2 40	4 05	6 15			
5 "	1 75	2 13	2 50	4 22	6 42			
5½ "	1 80	2 20	2 60	4 40	6 70			
6 "	1 85	2 27	2 70	4 58	6 98			
6½ "	1 90	2 35	2 80	4 75	7 25			
7 "	1 95	2 43	2 90	4 97	7 57			
7½ "	2 00	2 50	3 00	5 10	7 80			
8 "	2 05	2 57	3 10	5 30	8 10			
9 "	2 10	2 62	3 30	5 65	8 65			
10 "	2 15	2 68	3 50	6 00	9 20			
11 "	2 20	2 75	3 70	6 35	9 75			
12 "	2 25	2 80	3 90	6 70	10 30			

We are the only concern who carry a complete stock of chaplets, including larger sizes.

SIZES IN STOCK.



FIG. 135

All Tinned.



FIG. 136

All Tinned.

WROUGHT IRON CHAPLET STEMS.
PRICE PER HUNDRED.

Length, from Face of Stem.	DIAMETER.							
	$\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$
3 in.	\$1 55	\$1 83	\$2 10	\$3 53	\$5 33	\$7 47		
3½ "	1 60	1 90	2 20	3 70	5 60	7 85		
4 "	1 65	1 97	2 30	3 87	5 87	8 23		
4½ "	1 70	2 05	2 40	4 05	6 15	8 60		
5 "	1 75	2 13	2 50	4 22	6 42	8 97		
5½ "	1 80	2 20	2 60	4 40	6 70	9 35		
6 "	1 85	2 27	2 70	4 58	6 98	9 72		
6½ "	1 90	2 35	2 80	4 75	7 25	10 10		
7 "	1 95	2 43	2 90	4 97	7 57	10 47		
7½ "	2 00	2 50	3 00	5 10	7 80	10 85		
8 "	2 05	2 57	3 10	5 30	8 10	11 25		
9 "	2 10	2 62	3 30	5 65	8 65	12 00		
10 "	2 15	2 68	3 50	6 00	9 20	12 75		
11 "	2 20	2 75	3 70	6 35	9 75	13 50		
12 "	2 25	2 80	3 90	6 70	10 30	14 25		

Any size Plates to suit Stems will be furnished if desired.

SIZES IN STOCK. 

WROUGHT IRON CHAPLET STEMS.

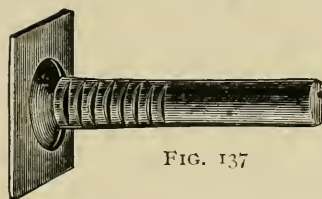


FIG. 137

WITH SQUARE PLATE FITTED.

PRICE PER HUNDRED.

Diam. of Plates.	1 1/4 in.	1 1/2 in.	1 3/4 in.	2 in.	2 1/2 in.	3 in.
Thick's of Plates	1 1/8 in.	7/8 in.	1/2 in.	1 1/4 in.	3/4 in.	1/2 in.
Diam. of Stem.	1/4 in.	5/16 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.
Length						
3 in.	\$2 80	\$3 43	\$4 00	\$6 43	\$9 83	13 97
3 1/2 "	2 85	3 50	4 10	6 60	10 10	14 35
4 "	2 90	3 57	4 20	6 77	10 37	14 73
4 1/2 "	2 95	3 65	4 30	6 95	10 65	15 10
5 "	3 00	3 73	4 40	7 13	10 92	15 47
5 1/2 "	3 05	3 80	4 50	7 30	11 20	15 85
6 "	3 10	3 87	4 60	7 47	11 48	16 22
6 1/2 "	3 15	3 95	4 70	7 65	11 75	16 60
7 "	3 20	4 03	4 80	7 83	12 07	16 97
7 1/2 "	3 25	4 10	4 90	8 00	12 30	17 35
8 "	3 30	4 17	5 00	8 20	12 60	17 75
9 "	3 35	4 25	5 20	8 55	13 15	18 50
10 "	3 40	4 33	5 40	8 90	13 70	19 25
11 "	3 45	4 40	5 60	9 25	14 25	20 00
12 "	3 50	4 50	5 80	9 60	14 80	20 75
Net Price for Curving Plates to Suit Diam. of Core.	25	35	45	60	75	1 00

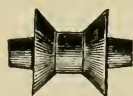


FIG. 138

DOUBLE HEAD CHAPLET STEMS.

Made of 3/8 inch round Iron, from 3/8 to 2 1/4 inches long (measuring from face of shoulder).

Price, per hundred, from 3/8 to 1 3/4 inches..... \$4 00

Price, per hundred, from 1 1/2 to 2 1/2 inches..... 5 00

DOUBLE HEAD CHAPLETS, WITH FORGED HEADS.

Made of 3/8 inch round Iron, from 3/4 to 2 1/2 inches long, with heads 3/4 inch in diameter.

Price, per hundred, from 3/8 to 1 3/8 inches.....\$5 00

Price, per hundred, from 1 1/2 to 2 1/2 inches..... 6 00

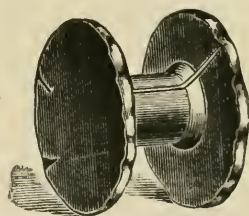


FIG. 139

DOUBLE HEAD CHAPLET STEMS, WITH SQUARE PLATES FITTED.

Tinned.

Stems made of 3/8 round Iron, from 1/2 to 2 1/2 inches long.

Price, per hundred, 1/2 to 1 inch, with plates from 3/4 to 1 1/4 inches \$8 00

Price, per hundred, 1 1/8 to 1 1/2 inches, with Plates from 1 1/2 to 2 inches..... 9 00

Price, per hundred, 1 3/8 to 2 1/2 inches, with Plates from 2 to 2 1/2 inches..... 10 00

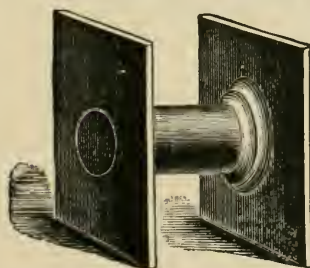


FIG. 140

Special Size Chaplets Made to Order.

"ESSO" PERFORATED TIN CHAPLETS

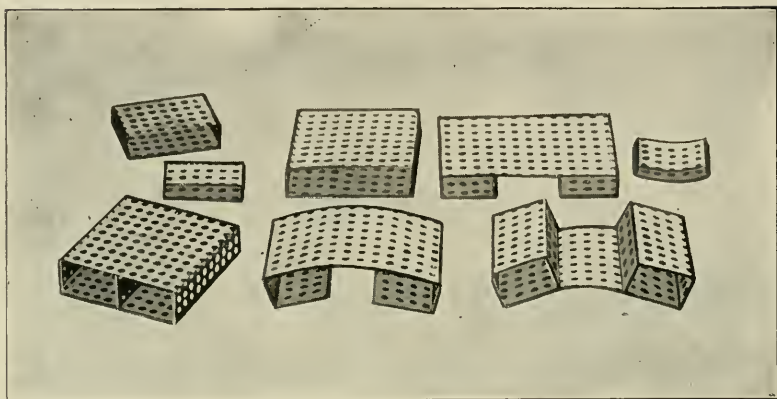


FIG. 141

These Can be Made in Any Size, Shape or Form

WE HAVE found, through experiment, and after considerable expense, the many advantages secured by the adoption of **Perforated Tin Chaplets**. They are used extensively on **radiator work** and in **stove foundries** where gas ranges are manufactured, and are particularly useful on gas-burners, water backs, water fronts and ends. **No measuring necessary, as the Chaplet is made the thickness of metal required.** The iron flows through all perforations, thus making a solid mass; whereas in using other type Chaplets there remains a head or rod extended outside of casting, which has to be chipped or cut off, thus entailing extra expense and loss of time, and adding innumerable chances for leakage.

On all **sanitary plumbing work, engine work or other castings** which necessarily have any port-holes, they are found invaluable; in fact, anything **pertaining to cored work of any description.** THE MORE COMPLICATED THE WORK, THE MORE INVALUABLE THEY WILL PROVE.

We are prepared to make the dies necessary to suit any class of work, making Perforated Tin Chaplets any size, shape or form required.

Write for particulars with prices.

Send for Trial Samples

"Everything You Need In Your Foundry"

RADIATOR CHAPLETS

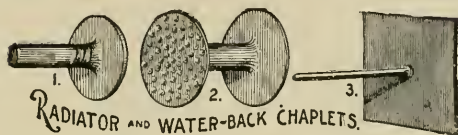


FIG. 142

No. 1. Head, $\frac{1}{2}$ inch, stem, $\frac{3}{16}$, length to order.

No. 2. Double Head, same size No. 1.

No. 3. Head, $\frac{3}{4} \times \frac{3}{4}$, stem, $\frac{3}{32}$, length to order.

Special Chaplets and Plates Made to Order

Write for Prices and Discounts

Prompt Shipments Guaranteed

LOVEJOY'S SHELL CHAPLETS

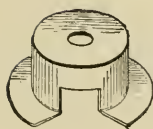


FIG. 143

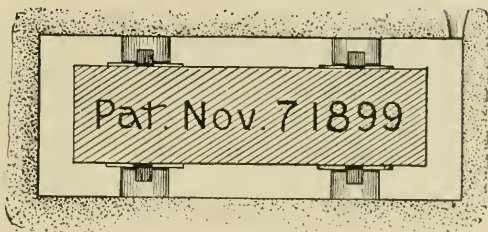


FIG. 144

The illustration shows the manner in which the Chaplets are placed when in use. They are made from $\frac{1}{8}$ -in. to 1-in. thickness and are used to a great advantage. An accurate adjustment of core may be secured without the use of gauges, effecting a saving of time and labor.

Also securing smooth surfaces of the casting outside and inside.

Perfect amalgamation of Chaplet with the cast metal.

A vented top for the escape of gas, thus insuring a full pour within the shell, consequently a preventive to "blowing" of the molten metal.

Strength to resist pressure and to do perfectly the work they are intended to accomplish.

Trial lots forwarded without charge. State thickness of metal in casting when ordering, and if possible give approximate weight of cores.

All sizes in stock and we make prompt shipments.

OBERMAYER'S GREY IRON CHAPLETS

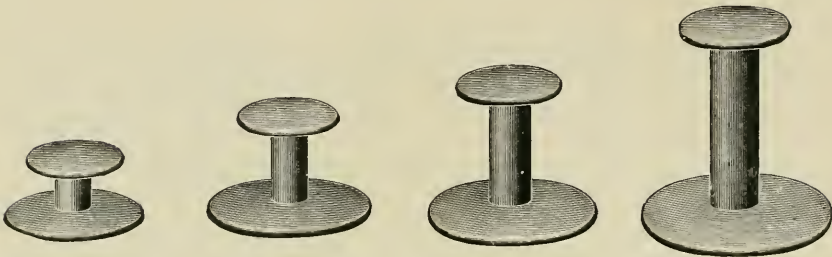


FIG. 145

We can furnish in large or small quantities the cheapest and most practical chaplets for general work that have been introduced. They are the invention of an experienced foundryman, and they have been tested in actual practice on various kinds of work.

They leave very little, if any blotch on the surface, and fuse well into the hot iron, so as not to cause blow holes. As they become part of the casting, there is no loss of weight, and the time saved in molding pays for the chaplets many times.

We make the following sizes:

List Prices

Length, $\frac{1}{4}$ inch		\$0.72	per hundred
" $\frac{3}{8}$ "		.78	"
" $\frac{1}{2}$ "		.84	"
" $\frac{5}{8}$ "		.90	"
" $\frac{3}{4}$ "		.96	"
" $\frac{7}{8}$ "		1.02	"
" 1 "		1.08	"
" $1\frac{1}{8}$ "		1.14	"
" $1\frac{1}{4}$ "		1.20	"
" $1\frac{3}{8}$ "		1.26	"
" $1\frac{1}{2}$ "		1.32	"
" $1\frac{3}{4}$ "		1.38	"
" 2 "		1.44	"

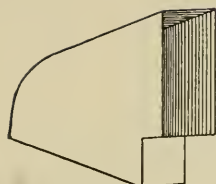
F. O. B. cars or express here. No charge for boxing.
We will accept no order for less than 500 of one size.

Coppering 40 cents per 100 extra.

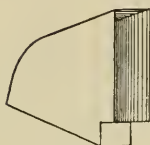
Prompt shipments.

DOOR CATCH

(Pat. May 31, 1898.)



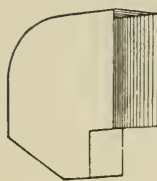
W No. 1



X No. 2



Y No. 3

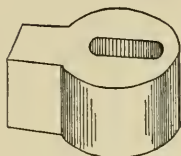


Z No. 4

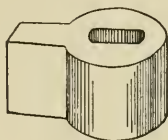
FIG. 146

SPRING COVER CATCH

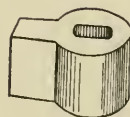
(Pat. May 16, 1899.)



A No. 1



B No. 2



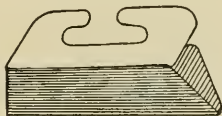
A B No. 3

FIG. 147

These catches are designed to dispense with setting cores or filing or cutting lugs to swinging hearths, tops or covers.

DOVE TAILS

(Pat. May 16, 1899.)



F F No. 1



G G No. 2

FIG. 148

For holding legs in stoves, sinks, bath tubs, or where dove tail is required in Foundry work.

HINGE TUBES

(Pat. May 16, 1899.)

All tubes filled with composition.

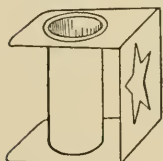


FIG. 149
Round Hole

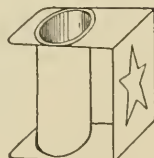


Fig. 150
Oval Hole

If Interested Write for Other Styles and Prices

Pattern Makers' Supplies

WE FURNISH A COMPLETE LINE OF

PATTERN SHOP SUPPLIES

WHICH CONSISTS OF

Brass and Malleable Iron, Peg, Plate, Shoulder and Tube
Dowels, Rapping Plates, Lifters, Leather Fillet, Brass
and White Metal Pattern Letters, Bending Irons,
Varnish Cans, Vises, Sand and Wood Trim-
mers, Hand Screws, Glue, Shellac and
all kinds of Glue and Paint
Brushes, etc., etc.



STOCK ROOM CINCINNATI WAREHOUSE

LABOR SAVING LEATHER PATTERN FILLETS



FIG. 151

Sizes run in sixteenths from $\frac{1}{16}$ to $\frac{3}{8}$ —in eighths from $\frac{3}{8}$ to 1 inch.

Our Flexible Leather Fillet can be applied to any corner, and is as easily handled upon a compound curve as in a straight line. It is the best fillet produced, and a trial never fails to demonstrate to the entire satisfaction of the most skeptical. It is a great time and labor saver, as the applying of it is accomplished with a single operation; no tacking or clamping, thus dispensing with the use of miter box. It is not affected by heat, cold or moisture any more than is the pattern itself, while its lightness, durability and neatness soon win for it golden opinions. The progressive pattern maker will perceive the absolute practicability of our Leather Fillet and its superiority to all others. It is furnished in lengths of 4 and 5 feet, and put up in bunches of 100 feet each, ready for shipment by mail or express. All sizes are constantly carried in stock and prompt shipments guaranteed.

Our Wood Fillet is made in eleven sizes—viz., from $\frac{1}{4}$ to 2-inch radius in 3 feet lengths, and sold by the yard. It is made of the best clear white pine, kiln dried and free from knots, sap and blemishes, worked in cove to feather edge. Our wood fillet, having the advantage of being shellaced on cove only, is constructed to accommodate the standard draft that all patterns should have; therefore, it will fit perfectly when in position, and is practically useful and of trifling cost.

How to Order.—Our Fillets are numbered by sixteenths contained in a radius, viz., 1 inch radius is No. 16. Always order by number. Be sure and state whether *Wood* or *Leather* is wanted. Use wood fillet for straight work, and leather fillet of same number for all curved lines. Sold by the yard, packed in light wooden cases. Owing to this fact 33 yards is the smallest quantity for which we accept orders.

Price List

Leather Pattern Fillet, per 100 Ft.

No.	1, $\frac{1}{16}$ in radius.	\$1 50
"	2, $\frac{1}{8}$ "	2 50
"	3, $\frac{3}{16}$ "	3 50
"	4, $\frac{1}{4}$ "	4 00
"	5, $\frac{5}{16}$ "	4 50
"	6, $\frac{3}{8}$ "	5 00
"	8, $\frac{1}{2}$ "	6 00
"	10, $\frac{5}{8}$ "	7 00
"	12, $\frac{3}{4}$ "	8 50
"	14, $\frac{7}{8}$ "	9 75
"	16, 1 "	10 50

Wood Pattern Fillet, per 100 Ft.

No.	4, $\frac{1}{4}$ in radius.	\$3 00
"	6, $\frac{3}{8}$ "	3 90
"	8, $\frac{1}{2}$ "	4 05
"	10, $\frac{5}{8}$ "	4 65
"	12, $\frac{3}{4}$ "	4 80
"	14, $\frac{7}{8}$ "	5 40
"	16, 1 "	6 00
"	20, $1\frac{1}{5}$ "	10 50
"	24, $1\frac{2}{5}$ "	12 00
"	28, $1\frac{4}{5}$ "	13 00
"	32, 2 "	15 00

Leather and Wood Fillet in Stock, all Sizes.

BRASS DOWELS OF ALL KINDS

Peg and Tube Brass Dowels

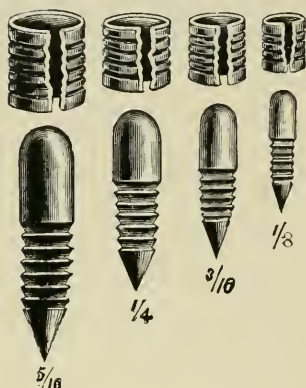


FIG. 152

$\frac{1}{8}$ in . . .	\$3.75 per gross
$\frac{3}{16}$ " . . .	4.50 "
$\frac{1}{4}$ " . . .	5.25 "
$\frac{5}{16}$ " . . .	6.00 "

Plate Brass Dowels

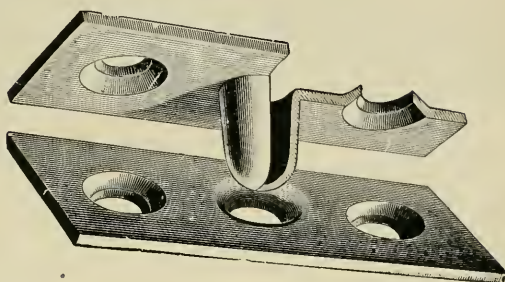


FIG. 153

Full Size $2\frac{1}{2}$ Inches

(Measurement Indicates Length of Plate.)

1 in.	\$ 6.50 per gross
$1\frac{1}{4}$ "	7.50 "
$1\frac{1}{2}$ "	8.50 "
2 "	13.50 "
$2\frac{1}{2}$ "	21.50 "

Brass Dowels With Pegs 1 in. in Diameter, \$3.00 Per Doz.

For Patterns are far superior to wooden pegs. Always perfect fitting and interchangeable

MOLDING SAND

If you are experiencing some trouble in securing a good sand in casting steel, we are in position to furnish you with a Sand suitable for Steel Work and which many foundrymen are using on this kind of work with good results, especially for Green Sand Molds.

Write us for prices.

SHOULDER BRASS DOWELS

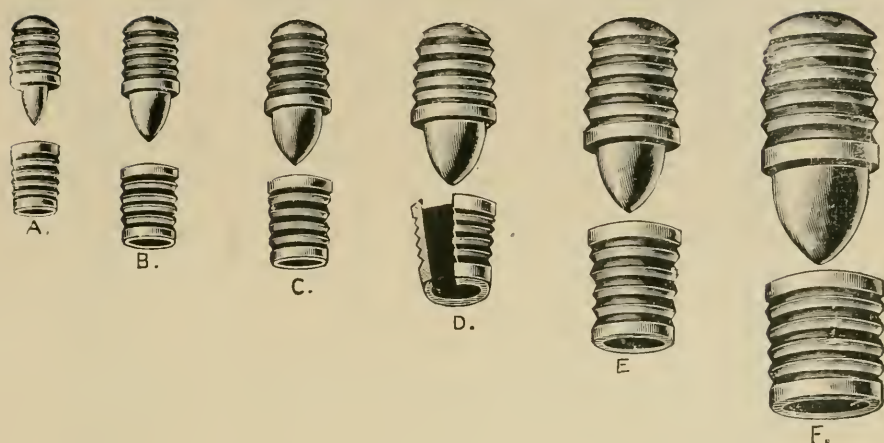


Fig. 154

Size A	Diam. of Pin	$\frac{1}{8}$ in.		\$ 4.50	per gross.
" B	"	$\frac{3}{16}$ "		5.50	"
" C	"	$\frac{1}{4}$ "		6.50	"
" D	"	$\frac{5}{16}$ "		8.50	"
" E	"	$\frac{3}{8}$ "		10.25	"
" F	"	$\frac{1}{2}$ "		12.50	"
" G	"	$\frac{5}{8}$ "		15.00	"

Order by Size

FILLET TOOLS

For Pattern Makers' Use in Applying Fillet



FIG. 155

No. 1.	For	$\frac{1}{16}$ in.	and	$\frac{1}{8}$ in.	at	\$0.50
" 2.	"	$\frac{3}{16}$ "	"	$\frac{1}{4}$ "	at	.75
" 3.	"	$\frac{5}{16}$ "	"	$\frac{3}{8}$ "	at	1.00
" 4.	"	$\frac{1}{2}$ "	"	$\frac{5}{8}$ "	at	1.50

Price Per Set \$3.50

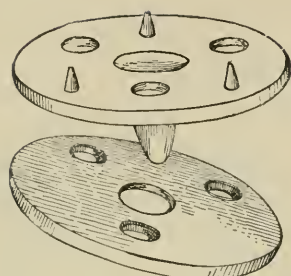


FIG. 156

MALLEABLE IRON DOWEL PINS

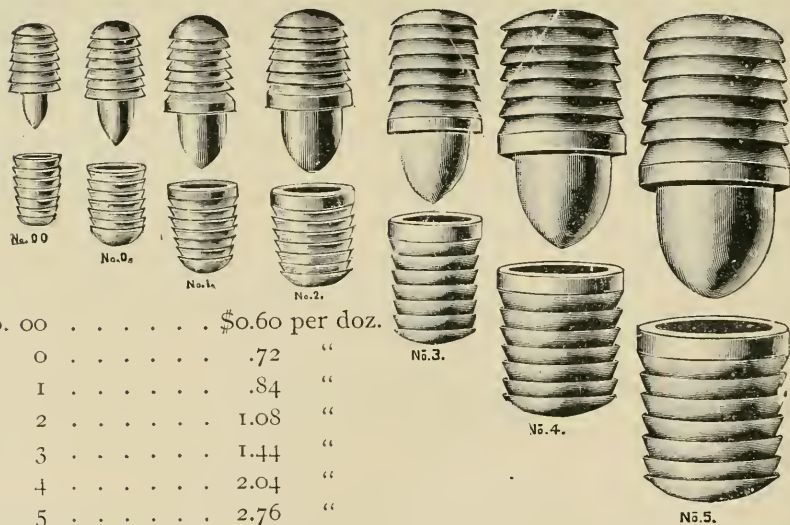
Pins and Holes Finished to Fit

Used In Same Manner As Brass Dowel Pins

$\frac{1}{4}$ in.	\$0.90 per doz. pairs.
$\frac{5}{16}$ "	1.20 "
$\frac{3}{8}$ "	1.50 "
$\frac{1}{2}$ "	1.80 "

$\frac{5}{8}$ in	\$2.10 per doz. pairs.
$\frac{3}{4}$ "	2.40 "
$\frac{7}{8}$ "	2.70 "
1 "	3.00 "

OBERMAYER'S BRASS DOWEL PINS



No. 00	\$0.60 per doz.
" 0	.72 "
" 1	.84 "
" 2	1.08 "
" 3	1.44 "
" 4	2.04 "
" 5	2.76 "

FIG. 157

Full Size—In Ordering Please Name Size

These Pins require no Mortising—No Wood Screws—No Squaring over of centre—but are placed in the old reliable way.

To place the Pin, bore a hole through the Cope and part way into the drag, the same as for wood dowels. Drive the Brass pin in from the parting and plug up the hole in the Cope.

We carry a large stock of the above on hand at all times. All orders filled promptly.

Protect Your Patterns by Using

FRASER'S PATTERN LIFTERS

$\frac{3}{8}$ -in	\$1.80 per doz.
$\frac{1}{2}$ "	2.25 "
$\frac{5}{8}$ "	2.70 "
$\frac{3}{4}$ "	3.30 "

We Have the above also with Key Sets

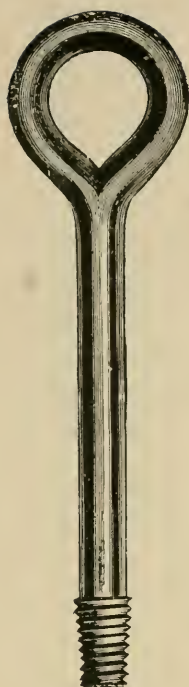


FIG. 158



FIG. 159



FIG. 160

Oblong Style

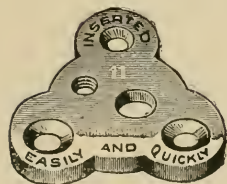


FIG. 161

Triangular Style

Made of malleable iron with rapping holes, tapped draw hole and screw holes.

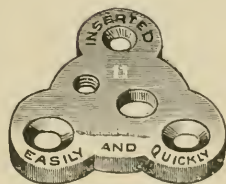


FIG. 162

Triangular Style



FIG. 163

Square Style

We carry them in stock, and all orders are promptly executed. We are exclusive selling agents.

Send us your orders.



FIG. 164

Square Style

FRASER'S RAPPING PLATES

No.			No.		
1	tapped $\frac{3}{8}$ -in . .	\$0.50 per doz.	11	tapped $\frac{1}{2}$ -in . .	\$1.05 per doz.
2	" " . .	.50	12	" $\frac{5}{8}$ -in . .	1.15
3	" " . .	.50	13	" " . .	1.30
4	" " . .	.60	14	" " . .	1.45
5	" " . .	.60	15	" " . .	1.65
6	" " . .	.70	16	" " . .	2.10
7	" $\frac{1}{2}$ -in . .	.75	17	" " . .	2.85
8	" " . .	.85	18	" $\frac{3}{4}$ -in . .	3.30
9	" " . .	.90	19	" " . .	3.90
10	" " . .	1.00	20	" " . .	4.35

Dimensions of the Different Styles of Rapping Plates

Oblong Style

Number.	Length.	Width.	Thickness.
1	1 $\frac{1}{2}$ inches.	1 $\frac{1}{8}$ inch.	$\frac{1}{8}$ inch.
2	2 " "	1 $\frac{1}{8}$ " "	$\frac{1}{8}$ " "
3	1 $\frac{5}{8}$ " "	1 $\frac{3}{8}$ " "	$\frac{1}{8}$ " "
4	1 $\frac{7}{8}$ " "	1 $\frac{3}{8}$ " "	$\frac{1}{8}$ " "
5	1 $\frac{3}{4}$ " "	$\frac{3}{4}$ " "	$\frac{1}{8}$ " "
6	2 $\frac{5}{8}$ " "	$\frac{3}{4}$ " "	$\frac{3}{8}$ " "
7	2 $\frac{1}{2}$ " "	$\frac{7}{8}$ " "	$\frac{3}{8}$ " "
8	3 $\frac{5}{8}$ " "	$\frac{7}{8}$ " "	$\frac{3}{8}$ " "
9	2 $\frac{1}{2}$ " "	1 " "	$\frac{1}{4}$ " "
10	3 $\frac{1}{2}$ " "	1 " "	$\frac{1}{4}$ " "
12	3 $\frac{3}{4}$ " "	1 $\frac{1}{4}$ " "	$\frac{5}{16}$ " "
14	4 $\frac{3}{8}$ " "	1 $\frac{1}{4}$ " "	$\frac{5}{16}$ " "
15	5 $\frac{1}{2}$ " "	1 $\frac{5}{8}$ " "	$\frac{5}{16}$ " "
17	5 $\frac{3}{8}$ " "	2 $\frac{7}{8}$ " "	$\frac{5}{16}$ " "
18	7 $\frac{1}{8}$ " "	2 $\frac{7}{8}$ " "	$\frac{5}{16}$ " "
19	10 $\frac{3}{4}$ " "	2 $\frac{7}{8}$ " "	$\frac{5}{16}$ " "

Triangular Style

Number.	Height.	Width.	Thickness.
11	2 in.	2 $\frac{1}{4}$ in.	$\frac{1}{4}$ in.

Square Style

Number.	Square.	Thickness.
13	2 $\frac{3}{8}$ in.	$\frac{1}{4}$ in.
16	2 $\frac{3}{4}$ " "	$\frac{1}{4}$ " "

We have the **exclusive sales agency** for **Frazer's Rapping Plates** throughout the United States and carry a large stock at each one of our plants. They are made of a superior quality of malleable iron, with rapping holes, tapped draw and screw holes. They are as necessary for pattern shops as screws and nails, and the low price enables large manufacturers to carry a stock at a very small expense. Order a quantity and give them a trial.

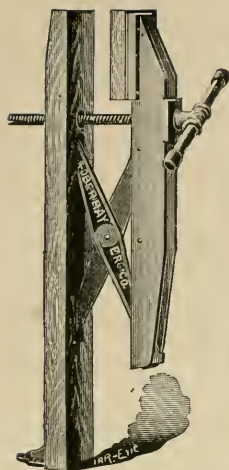


FIG. 165

PATTERN MAKERS' VISE

Jaws Leather Faced

Height, 42 in.; width jaw, 6 in.; depth to screw, 10 in.; opens 18 in.; screw, 24 x 1 1/4 in.

Price, \$16.50

Adopted by the largest and best equipped shops as the most practical Pattern Makers' Wood Vise.

Jaws always open parallel, but they can be adjusted to catch taper by loosening screw at bottom.

WINKLEY THREADED BRASS DOWEL PINS

For Patterns

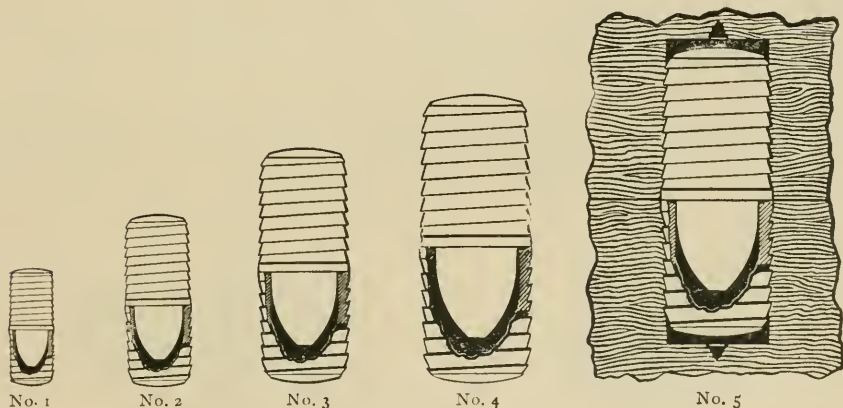


FIG. 166

They are made to fit holes bored by Jennings' Bits as follows :

No. 1.	To fit hole	$\frac{3}{16}$ in.,	size of pin,	$\frac{1}{8}$ in.		\$2.50	per 100 pair
No. 2.	" "	$\frac{5}{16}$ "	" "	$\frac{1}{4}$ "		3.50	" "
No. 3.	" "	$\frac{7}{16}$ "	" "	$\frac{5}{16}$ "		5.50	" "
No. 4.	" "	$\frac{9}{16}$ "	" "	$\frac{3}{4}$ "		8.00	" "

These Dowel Pins are made of brass and so arranged that they may be driven or screwed into place and easily removed at any time by simply unscrewing same. Especially valuable in hard wood patterns. Made in four sizes and so arranged that the upper half of the pattern frees itself as soon as it is well started. These Threaded Dowels are used extensively by manufacturers of fine machine tools, as they are inductive to good smooth joints on castings. The cuts shown above are full size of Dowels. Figure No. 5 shows a sectional view of one of these Dowels when placed in the pattern.

No. 20 GLUE HEATER

Has Four No. 2 One-Quart Galvanized Pots

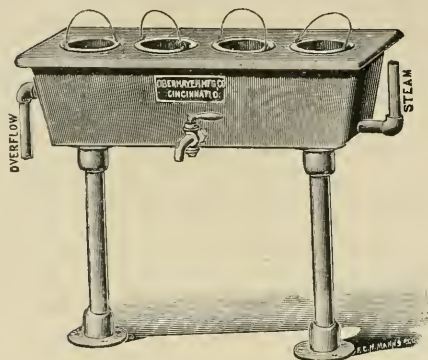


FIG. 167

Weight, 125 pounds.

Floor space 12 x 30 inches.

No. 20 Heater furnished complete as shown.

No. 6½ GLUE HEATER. No. 26 GLUE HEATER

Has One Two-Gallon Galvanized Pot

Has Two No. 4 Half-Gallon Galvanized Pots

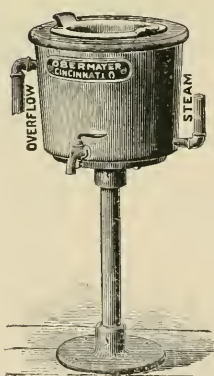


FIG. 168

Floor space 16 x 16 inches.

Weight, 110 pounds.

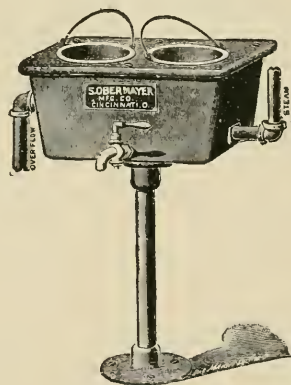


FIG. 169

Floor space 12 x 24 inches.

Weight, 100 pounds.

No. 6½ Heater or No. 26 Heater furnished complete as shown.

NEW DOUBLE-END WOOD LATHE

With Floor Stand, Etc.

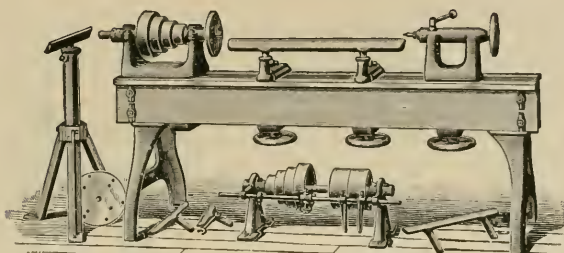


FIG. 170

These improved lathes are offered to the trade at the price of single-end lathes.

The workmanship and materials are first-class in all respects.

The head and tail stocks are cored hollow with the metal placed so as to resist all vibration or "chatter," and are planed true on the bottom to fit the shears.

The spindles and centers are of refined steel, constructed in such a manner as to hold the work firmly.

Particular attention is called to the lock nuts for taking up end wear of headstock spindle, which improvement will be appreciated by operators, as it leaves the end of spindle free to attach or detach the face plate at will.

The cone pulleys are of iron, very light, perfectly balanced and have four speeds.

The journal bearings are lined with a fine grade of genuine Babbitt metal nicely fitted to insure a high rate of speed without heating.

The shears are made of wood, 10 inches deep, 6, 7 and 8 feet between centers of lathe, and firmly bolted to cast-iron legs.

Each lathe is furnished complete as shown.

They are made in three sizes: 12, 16 and 20-inch swing.

12-inch lathe has tight and loose pulleys $6 \times 3\frac{1}{4}$ inches, and should make 900 revolutions per minute. Weight 625 pounds.

16-inch lathe has tight and loose pulleys $8 \times 3\frac{1}{4}$ inches, and should make 800 revolutions per minute. Weight 825 pounds.

20-inch lathe has tight and loose pulleys $8 \times 4\frac{1}{4}$ inches, and should make 700 revolutions per minute. Weight, 1025 pounds.

When order is given specify size of swing desired.

12-inch swing complete as shown, 6 feet between centers.

16-inch swing complete as shown, 7 feet between centers.

20-inch swing complete as shown, 8 feet between centers.

NEW 36-INCH BAND SAW

Weight, 1275 pounds.

The machine illustrated here will carry blades $\frac{1}{8}$ to 2 inches wide, 18 feet 6 inches long, and will do light or heavy sawing in the most satisfactory manner.

The column is cored hollow and has broad base, making a substantial floor bearing, insuring a smooth, steady running machine.

The table is of iron, with lever for locking same at any angle up to 45 degrees. When desired we furnish an adjustable ripping gauge at extra cost.

The wheels are 36 inches diameter, 2-inch face, with hubs and rim plates drilled and tapped to receive the solid steel spokes. The endless wood rims are made of $\frac{1}{4}$ -inch veneer turned true and covered with best grade of canvas-back rubber bands, the combination forming a strong, safe, reliable high speed wheel not affected by heat, cold or use, and will remain true.

The shafts are of the best steel, carefully fitted into dust proof Babbitted bearings adjustable for wear and have large oil chambers.

The tension on the saw blade, also the tracking of the blade, is accomplished by hand wheels shown and can be adjusted from front side of machine while in motion. The vertical adjustment of upper wheel is 7 inches.

The guide bar is square and counter-weighted. Space between table and saw guide $15\frac{1}{2}$ inches, between saw blade and frame 36 inches.

The saw guides furnished are either our improved non-friction guides or plain adjustable guides with reversible steel back plate and hard wood side guides.

The shifter is arranged to receive the belt from any direction.

The tight and loose pulleys are $14 \times 3\frac{1}{2}$ inches and should make 475 to 500 turns per minute. The loose pulley has 6-inch Babbitted hub.

Each machine has wrench, brazing tongs and vise.

Can furnish machine with iron tilting,

Improved non-friction upper and lower guides,

Plain adjustable upper and lower guides,

Non-friction upper and plain lower guides or ripping gauge.

Specify parts desired when writing for prices or placing orders.

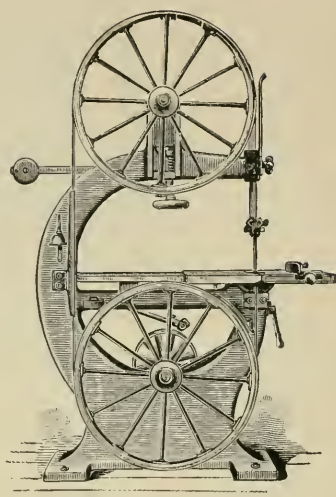


FIG. 171

No. 5½ UNIVERSAL SAW BENCH

Weight, Machine and Countershaft 1000 pounds.

Weight, Boring Attachment 150 pounds.

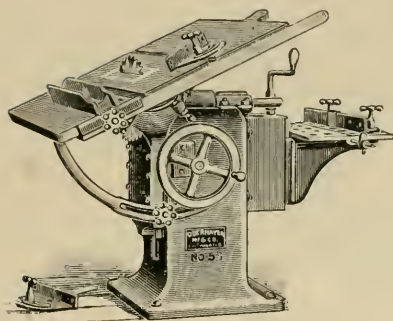


FIG. 172

This machine is specially designed for general shop use and will do a variety of work, such as ripping, cross-cutting, mitering, chamfering, gaining, grooving, rabbeting, boring and routing in a rapid and satisfactory manner.

The column is extra heavy and the metal properly distributed to prevent all vibration, and the broad base has large floor bearing, insuring a smooth, steady running machine.

The table is of iron, 36 x 42 inches, accurately grooved to receive the gauges. There is an opening in the table over the mandrel to receive the saw, also heads up to 1¾ inches wide.

The heavy bracket supporting the table has a vertical adjustment of 6 inches on gibbed way, by means of screw, ball bearing bevel gears and large hand wheel. On top of this bracket is the adjustable segment bearings having graduated scale for setting the table at any angle up to 45 degrees and locked by slotted arm and hand wheel shown.

Three gauges are furnished, two adjustable miter gauges and one box gauge, which can be used on either side of the saw for ripping stock up to 14 inches on left of saw and 20 inches on right of saw.

The mandrel is of crucible steel, 1 7/16 inches diameter in bearings and 1 ¼ inches diameter between flanges, and is fitted with expansion device for centering saws. The pulley is 4½ inches diameter by 5¼ inches face. A 16-inch saw will project 4½ inches above table.

The boring table is iron, 14 x 24 inches, has fence for straight or angular boring and has stop to regulate depth of holes. The vertical adjustment is by screw and detachable crank. All sliding parts are gibbed to take up wear.

The countershaft can be placed on floor back of machine or below the floor, as desired. The driving pulley is 16 x 5¼ inches. Tight and loose pulleys 8 x 5¼ inches, and should make 800 to 850 revolutions per minute.

Can furnish Machine with box fence, two miter gauges and countershaft, no saw,
Boring table or half-inch universal chuck,
14-inch or 16-inch rip saw.

Kindly state just what parts are wanted when writing for prices or placing orders.

NO. 3 HAND PLANER AND JOINTER

Weight, 12-inch, 1150 pounds; 16-inch, 1350 pounds; 20-inch, 1550 pounds; 24-inch, 1750 pounds.

The accompanying illustration represents our New Hand Planer and Jointer, of modern design and practical construction.

The column is cast in one piece, with large floor bearing, and is cored in such a manner as to form a cabinet for tools, etc.

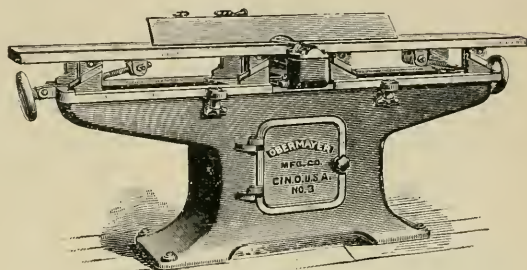


FIG. 173

The tables are 7 ft. long, adjustable on interlocking inclines to a depth of $\frac{3}{4}$ inch, by means of steel screws, swiveling nuts and hand wheels shown. By releasing two small hand wheels, the frames supporting the tables can be moved back for setting and sharpening the knives. Adjustable stops are provided to prevent the tables coming in contact with the knives. The opening over cutter head is $1\frac{3}{4}$ inches when making $\frac{1}{8}$ -inch cut.

The fence is of the most rigid and convenient construction, is adjustable to any angle up to 45 degrees and firmly locked by an eccentric clamp. It is secured to extensions on the back table, by means of hand wheels and slotted base, which permits of using the full width of knives without removing the fence.

The cutter head is made of crucible steel, arranged to carry two knives.

The journals are of large diameter and length and revolve in self-contained bearings, nicely fitted and firmly bolted to the column. The bearings are lined with genuine Babbitt metal, are self-oiling and adjustable for wear. Cutter head pulleys on 12 and 16-inch machine, $4\frac{1}{4} \times 4\frac{1}{2}$ inches, and should make 4500 revolutions per minute; on 20 and 24-inch machine, $4\frac{1}{2} \times 5\frac{1}{2}$ inches, and should make 4250 revolutions per minute.

The countershaft is furnished complete with adjustable hangers, belt shifter, etc., and can be placed in any position desired.

Tight and loose pulleys for 12 and 16-inch machine, 10×4 inches; 20 and 24-inch machine, 10×5 inches, and should make 870 revolutions per minute.

Each machine thoroughly tested up to full speed on actual work and guaranteed strictly first-class in all respects.

Machine with 12-inch head or 16-inch head with countershaft.

Machine with 20-inch head or 24-inch head with countershaft.

When order is given specify size head desired.

No. 3 24-INCH SINGLE SURFACER AND SMOOTHER

Weight, 2000 pounds.

This illustration correctly represents our new improved planer, specially designed for general shop use. It will plane stock from $\frac{1}{8}$ to 7 inches in thickness and 24 inches wide without clipping the ends.

The frame is of the most compact and rigid construction with floor bearings the full length of base, and with the metal properly distributed to resist vibration, insures a smooth, steady running machine.

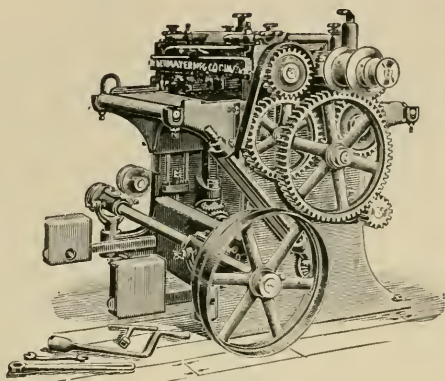


FIG. 174

The bed is one casting, planed true and nicely fitted to the frame on gibbed ways adjustable for wear. It is made extra heavy and is double ribbed below cutter head.

The cylinder head is of crucible steel, carries two knives, is double belted and will receive the belts from any direction. The journals are $1\frac{9}{16}$ inches diameter by $8\frac{1}{2}$ inches long and revolve in adjustable self-oiling bearings, lined in a special manner with genuine Babbitt metal.

The pressure bars embody the latest improvements. The receiving pressure bar is very heavy and is hinged to swing clear of the cutter head for setting or sharpening the knives. Both bars set close to the cylinder head for planing short stock, but cannot be brought in contact with the knives.

The feed works are driven from the cylinder head by open belt, has two changes of speed, 20 and 30 lineal feet per minute, and is controlled by swinging arm carrying binder pulley. There are six adjustable feed rolls. The two upper rolls are powerfully geared. The in-feeding roll is weighted, the out-feeding roll has steel coil spring pressure. We apply to this machine our special adjustment for in-feeding rolls which prevents the marking of stock to be replanned, no matter how light the cut.

Countershaft has tight and loose pulleys 10×6 inches, and should make 870 revolutions per minute.

Feed belts—One $1\frac{1}{2}$ inches by 7 feet 3 inches.

One $2\frac{1}{2}$ inches by 4 feet $5\frac{1}{2}$ inches.

Each machine thoroughly tested up to full speed on actual work, and guaranteed strictly first class in all respects.

We furnish this Machine complete with countershaft, no belts.

OBERMAYER UNIVERSAL WOOD TRIMMERS**For Your Pattern Shop**

For full particulars of these high-grade trimmers send for our special catalogue, which illustrates and describes these useful tools.

All Kinds of Pattern Makers' Supplies Carried in Stock

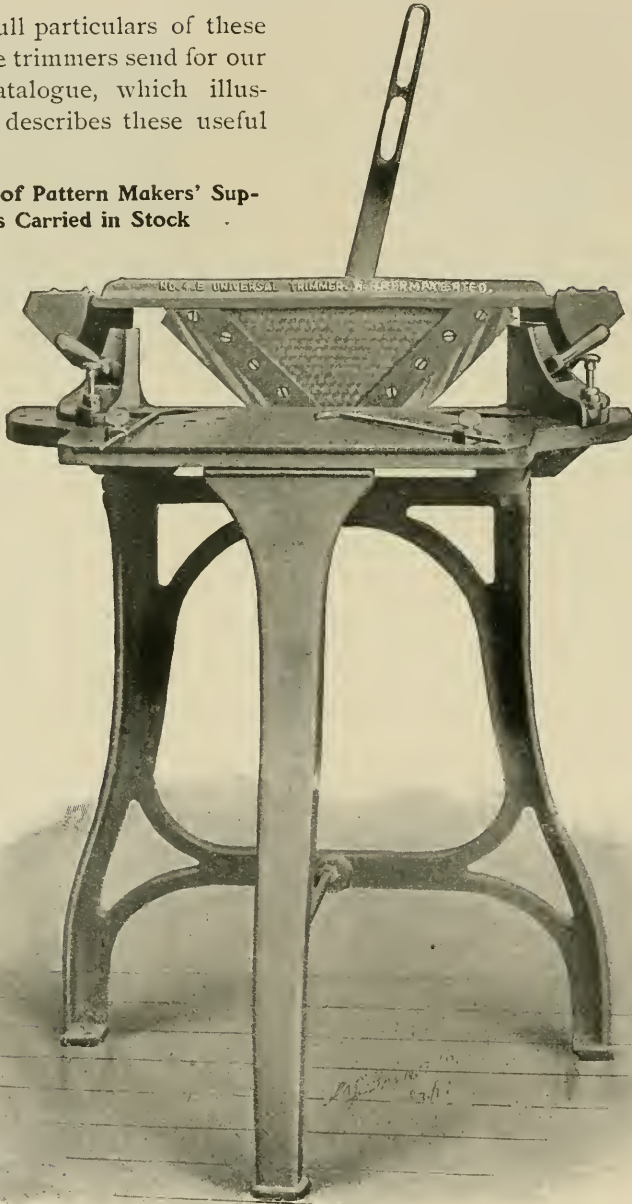


FIG. 175
Rear View of No. 4E for Small Work

OBERMAYER'S UNIVERSAL TRIMMERS

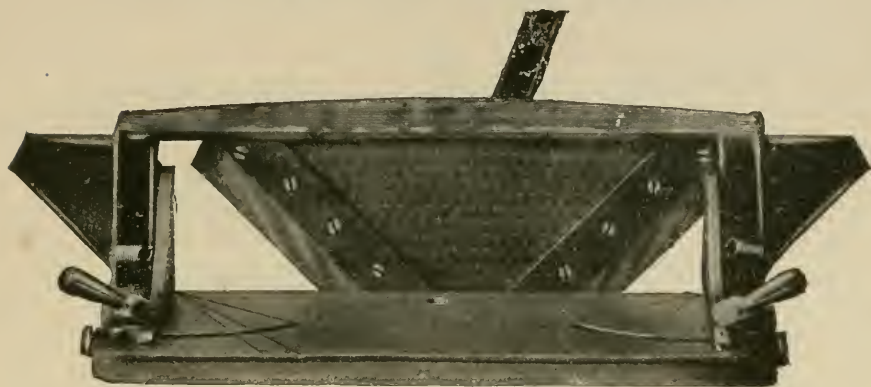


FIG. 176

Back View No. 4 B, Universal Trimmer.

Accurate

Serviceable

Cheap

The No. of Machine is Height of Cut in Inches.	Cut Long. Inches.	Size Bed, Inches.	Between Gauges, Inches.	Length of Stroke, Inches.	Cubic Feet	Export Shipping Weight.	Price.	Extra Knives Per Set.
2 A	4 $\frac{1}{4}$	4 $\frac{1}{2}$ x 10 $\frac{1}{2}$	8 $\frac{1}{4}$	4	$\frac{1}{4}$	11	\$ 20.00	\$ 4.00
4 A	8	7 $\frac{1}{2}$ x 17 $\frac{1}{2}$	14	9	1	36	30.00	6.00
5 A	8 $\frac{1}{4}$	9 $\frac{1}{2}$ x 20	16 $\frac{1}{2}$	8 $\frac{1}{2}$	1 $\frac{1}{2}$	55	40.00	7.00
6 A	12 $\frac{1}{2}$	11 $\frac{1}{2}$ x 27 $\frac{1}{2}$	22	13 $\frac{1}{2}$	4 $\frac{1}{2}$	144	58.00	9.00
3 B	6	6 x 15	12	6 $\frac{1}{2}$	$\frac{3}{4}$	30	25.00	6.00
4 B	8	8 x 20	16 $\frac{1}{4}$	8 $\frac{1}{2}$	1 $\frac{1}{2}$	47	32.00	7.00
4 E	9 $\frac{1}{4}$	13 x 29 $\frac{1}{2}$	17 $\frac{1}{2}$	9 $\frac{1}{2}$	8 $\frac{3}{4}$	237	63.00	7.00
6 E	12 $\frac{1}{2}$	18 x 39 $\frac{1}{2}$	24 $\frac{1}{2}$	13 $\frac{1}{2}$	15 $\frac{3}{4}$	500	90.00	10.00
6 F	19	18 x 35	19	27	30	600	110.00	10.00
8 F	24 $\frac{1}{2}$	24 x 40	24 $\frac{1}{2}$	32	48	900	140.00	15.00

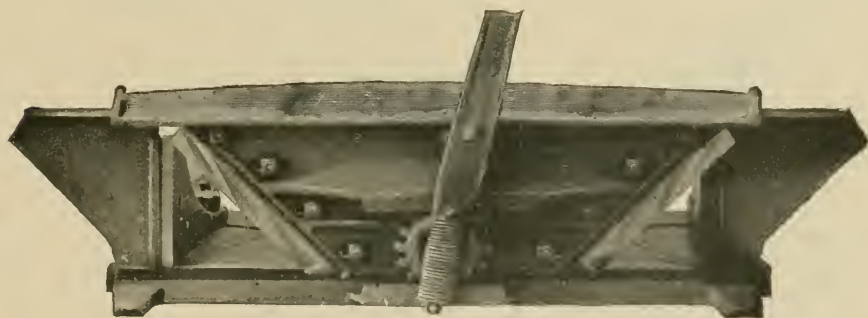


FIG. 177

Front View No. 4 A.

We recommend sizes 4 E or 6 E for general use and 4 A Individual Bench use.

Correspondence solicited.

PIG IRON BARROWS

Made for Carrying Pig Iron, Castings, etc.

Bottom, 3×2 ft.; $8\frac{1}{2}$ inches high in front. Strips of $1\frac{1}{4}$ -inch iron bolted to bottom and handles. 19-inch wheel, tread, $1\frac{3}{4}$ -inch. Tire, $\frac{1}{4}$ -inch thick. For all kinds of heavy work. Weight, 90 lbs.

Price, \$8.00 Each

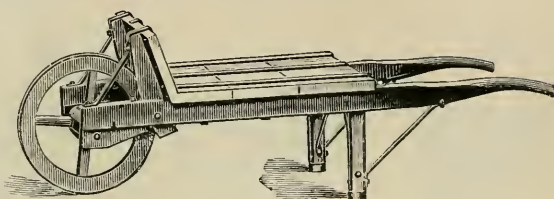


FIG. 178

Obermayer's Hand-Made Pig Iron Barrow

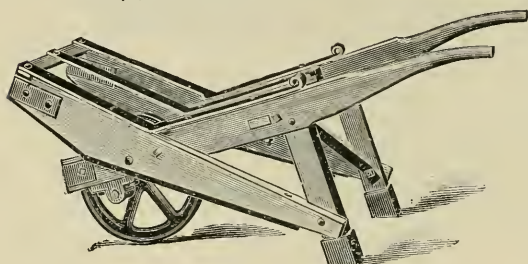


FIG. 179

Obermayer's Open Hearth Barrow

The strongest and heaviest wood Barrow made. Ironed with $\frac{1}{2}$ -inch iron. It is used for large pigs or billets. Cast iron shoes bolted on legs and 40-lb. cast iron wheel. Handles, 54 inches long; length of iron work, 34 inches.

Price, \$14.00 Each

"Esso" Tubular Steel Frame Pig Metal Barrow

Used in Iron Foundries for Handling Pig Iron

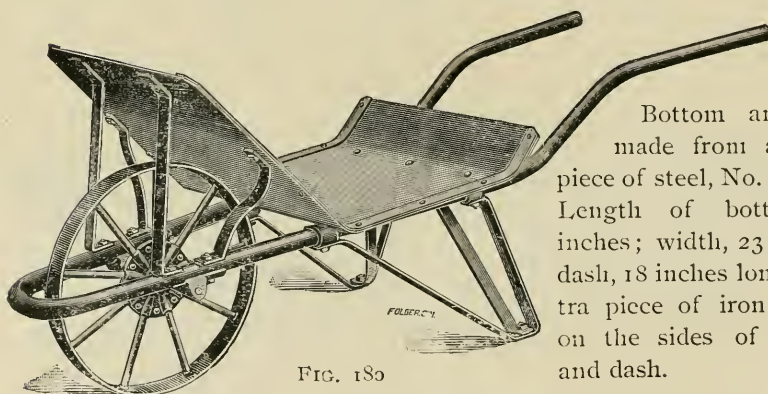


FIG. 180

Bottom and dash made from a single piece of steel, No. 7 gauge. Length of bottom, 18 inches; width, 23 inches; dash, 18 inches long. Extra piece of iron riveted on the sides of bottom and dash.

This Barrow is very strong and well braced and the load is carried well over the wheel, making it very light on the arms. It is particularly adapted for foundries and rolling mills. Weight, 100 lbs.

Wheel (No. 4), 17 inches in diameter; tire, $2 \times \frac{3}{8}$ inch; nine $\frac{9}{16}$ -inch spokes, shouldered and riveted; axle, $\frac{3}{4}$ inch.

NATIONAL PATENT PIG IRON BARROWS

Extra Heavy and Strong

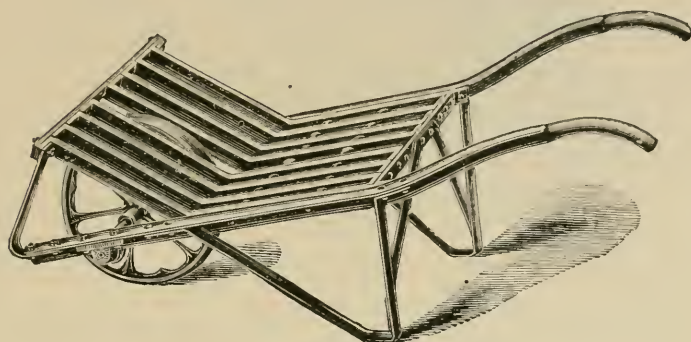


FIG. 181

No. 16. Price, \$25.00

National Pig Iron Barrow With Two Wheels

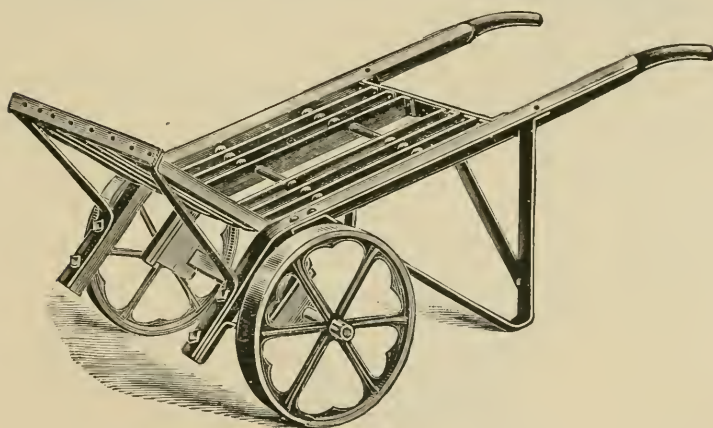


FIG. 182

No. 17. Price, \$35.00

Our Patent Pig Iron Barrow is particularly adapted for handling Pig Iron and heavy castings. In the construction of this Barrow iron strips are set edgewise and securely fastened together, presenting a platform firm and indestructible in use. In barrows of other make the sheet iron will soon wear out from the heavy weights thrown upon it.

Our Patent Paper Sheaths will overcome the objectionable effects of extreme heat and cold, greatly increasing the utility of this Barrow.

OBERMAYER'S PIG IRON BARROW

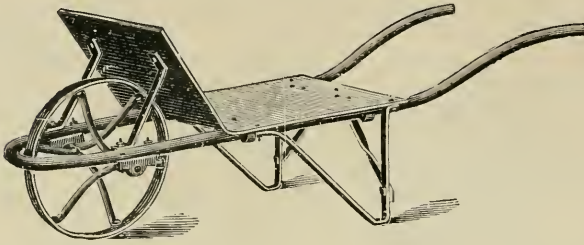


FIG. 183

No. 7. Weight, 78 pounds, $\frac{1}{4}$ -in. plate, 20 x 23-in., 13-in. dash . . \$10.50

OBERMAYER'S STEEL WHEELBARROW

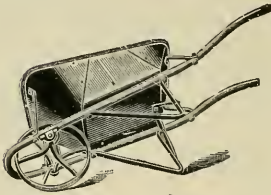


FIG. 184

General Coal Barrows

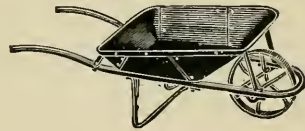


FIG. 185

Mining and Foundry Barrows

No.	Capacity.	Weight.	Price.
1	325 lbs.	90 lbs.	\$ 8 40
4	225 "	80 "	9 60
2	400 "	95 "	10 80
5	480 "	100 "	12 00

No.	Capacity	Weight.	Price.
9	3 cub. feet	88 lbs.	\$ 9 60
10	4 cub. feet	94 lbs.	12 00

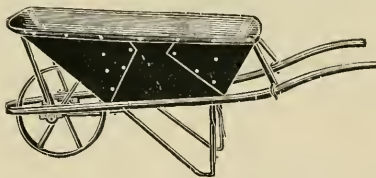


FIG. 186

Coke, Ash and Light Material Barrows

No. 11. Capacity, 6 cubic feet, weight, 100 pounds \$15.00

Our Foundry Barrows are built extra strong and heavy to withstand rough usage in the Foundry. We make a specialty of them.

Special Wheelbarrow Catalogue with prices and discounts on application.

“ESSO” SOLID PRESSED STEEL TRAY FOUNDRY BARROW

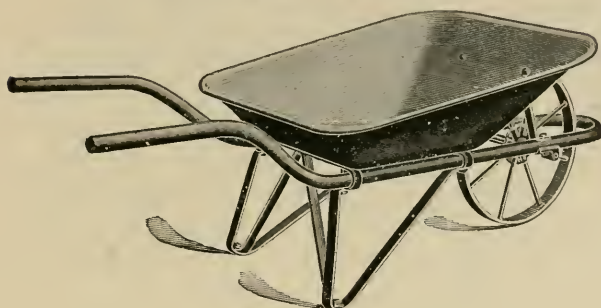


FIG. 187

Table of Dimensions, Capacity and Weight of Figure A and B Barrows, With One-Piece Steel Tubular Frame

	Gauge of Steel in Tray.	Length on Top.	Width on Top.	Depth at Wheel.	Depth at Handle.	Greatest Height.	Capacity. Cub. Ft.	Weight.
A 4	15	33 in.	28 in.	7½ in.	4½ in.	20 in.	3 ft.	70 lbs.
A 5	14	33 "	28 "	7½ "	4½ "	20 "	3 "	75 "
A 6	12	33 "	28 "	7½ "	4½ "	20 "	3 "	85 "
B 4	15	37 "	30 "	9½ "	5¾ "	21½ "	5 "	80 "
B 5	14	37 "	30 "	9½ "	5¾ "	21½ "	5 "	85 "
B 6	12	37 "	30 "	9½ "	5¾ "	21½ "	5 "	100 "

Greatest Length of All Barrows, 68 inches

“ESSO” STEEL TRAY COKE BARROW

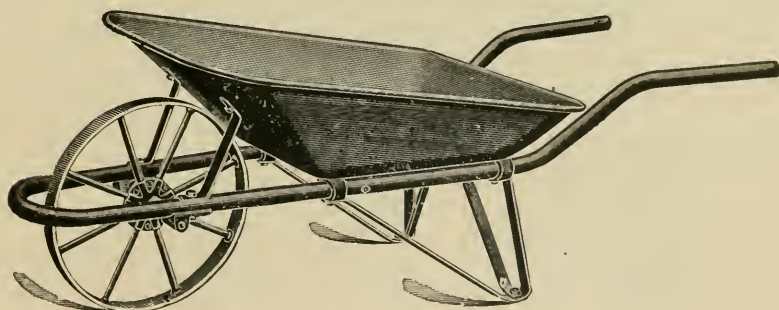


FIG. 188

Coal and Coke Barrow. Frame strongly braced and well ironed. The tray is made of best quality of steel, with wired edge. Capacity from 400 to 450 pounds of coal or five bushels of coke.

Dimensions, Capacity and Weight of Two Sizes.

Size of Barrow.	Gauge of Steel in Tray.	Length of Tray on Top.	Width of Tray on Top.	Depth at Wheel.	Depth at Handle.	Capacity.	Weight.
No. 10	13	41½ in.	33 in.	12 in.	6 in.	6 cub. ft.	110 lbs.
No. 12	15	41½ "	33 "	12 "	6 "	6 " "	95 "

NATIONAL PATENT FOUNDRY BARROWS

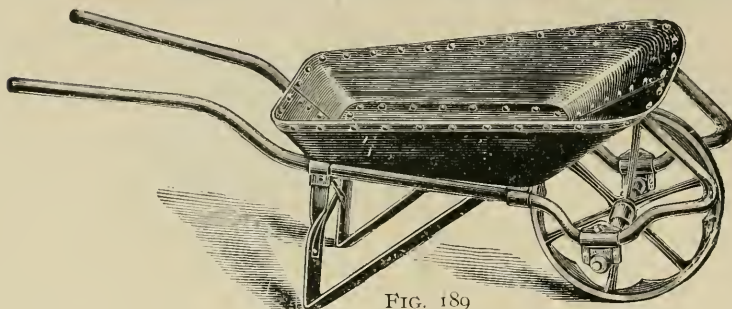


FIG. 189

Extra Heavy and Strong

- No. 4 A. Greatest width of tray, 29 inches; greatest length of tray, 32 inches; 16-inch wheel; tray of Nos. 12 and 10 iron \$14.00
- No. 5 A. Greatest width of tray, 31½ inches; greatest length of tray, 36 inches; 16-inch wheel; tray of Nos. 12 and 10 iron 15.00
- No. 6 A. Greatest width of tray, 32 inches; greatest length of tray, 36 inches; 16-inch wheel; tray of Nos. 12 and 10 iron 16.50

NOTE—Our A Barrows have sides of No. 12 iron and bottoms of No. 10 iron.

We make AA or Patent Extra Heavy Foundry Barrows, having trays of Nos. 12 and 8 iron, at the following prices:

- No. 4 AA. Same size as No. 4 A; tray of Nos. 12 and 8 iron \$15.00
- No. 5 AA. " " " No. 5 A; " Nos. 12 " 8 " 16.00
- No. 6 AA. " " " No. 6 A; " Nos. 12 " 8 " 17.50

NATIONAL PATENT COAL BARROWS

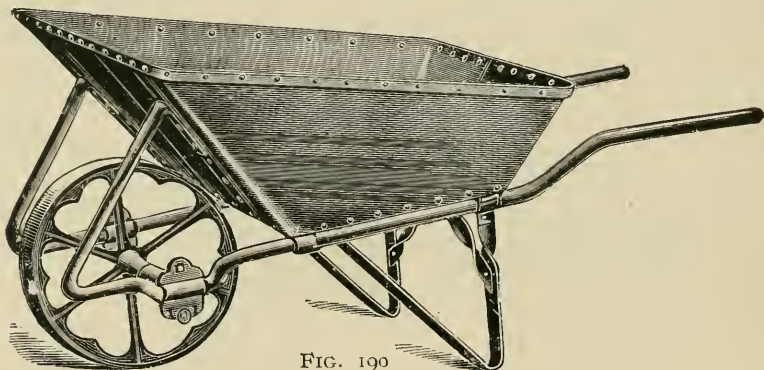


FIG. 190

Square Trays—Extra Heavy and Strong

- No. 9. Greatest width of tray, 32 in.; greatest length of tray, 34 in.; capacity, 260 lbs., or 3½ bushels of coal; 17-in. wheel, tray of Nos. 14 and 10 iron, \$22.00
- No. 10. Greatest width of tray, 33 in.; greatest length of tray, 36 in.; capacity, 340 lbs., or 4½ bushels of coal; 17-inch wheel; tray of Nos. 14 and 10 iron, 24.00
- No. 11. Greatest width of tray, 35 in.; greatest length of tray, 38 in.; capacity, 400 lbs., or 5½ bushels of coal; 17-inch wheel; tray of Nos. 14 and 10 iron, 26.00
- No. 12. Greatest width of tray, 36 in.; greatest length of tray, 40 in.; capacity, 480 lbs., or 6½ bushels of coal; 17-inch wheel; tray of Nos. 14 and 10 iron, 28.00
- No. 13. Greatest width of tray, 38 in.; greatest length of tray, 42 in.; capacity, 600 lbs., or over 8 bushels of coal; 17-inch wheel; tray of Nos. 14 and 10 iron 30.00

NATIONAL DOUBLE WHEEL STEEL BARROW

For Coal or Coke

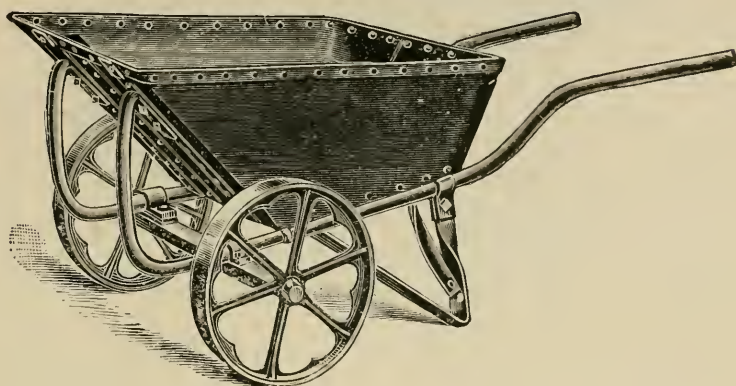
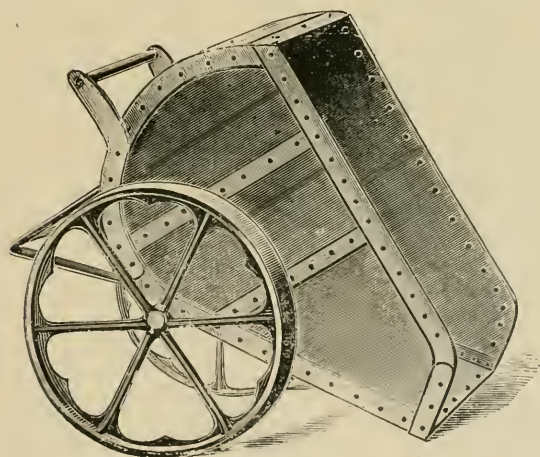


FIG. 191

No. 13½. Size and capacity same as No. 13, but with two wheels . . \$38.00

NOTE—Our Patent Coal Barrows, with Square Trays, are also made in the A (of Nos. 12 and 10 iron) and AA (of Nos. 12 and 8 iron) styles of the same size and capacity as the preceding at the following prices:

No. 9	A . \$23.50	No. 12	A . \$29.75	No. 9	AA, \$24.50	No. 12	AA, \$30.75
No. 10	A . 25.50	No. 13	A . 32.00	No. 10	AA, 26.75	No. 13	AA, 33.50
No. 11	A . 27.50	No. 13½	A . 40.00	No. 11	AA, 28.50	No. 13½	AA, 42.00



NATIONAL CHARGING BARROWS

For Charging Blast
Furnaces and Gas Retorts

Extra Heavy and
Strong

FIG. 192

Number.	Dimensions of Body in Inches.			Capacity in in Cubic Feet.	Price, each.
	Width.	Depth.	Length.		
18	20	21½	54	10	\$116.00
19	21	25	54	12	124.00
20	24	26	54	14	130.00
21	26	28	56	16	136.00
22	28	30	57	20	144.00

"OBERMAYER" CHARGING BARROWS

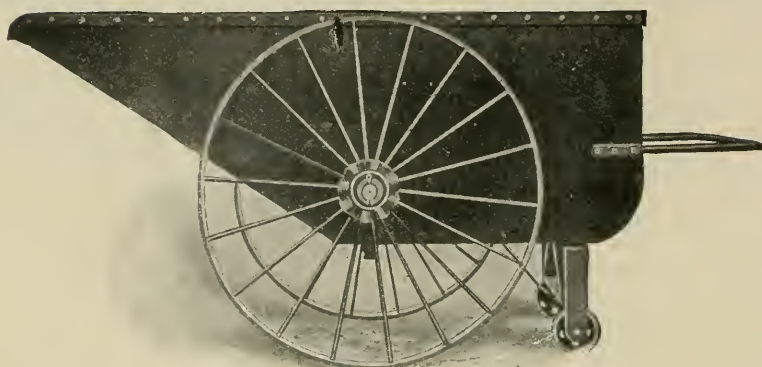


FIG. 193

Coke or Coal Charging Barrow

This barrow is built of No. 10 steel; the box is 86 inches long, 30 inches wide, 30 inches deep; the axle is 2×2 steel with a 4 inch drop, making the bottom of the Barrow stand 18 inches above the floor. The same is mounted on two 44 inch wheels, run on roller bearings, also two small 6 inch trail wheels. This Barrow is frequently used for coaling engines. No. 70. Capacity 36 cubic feet, weight, 700 pounds \$130.00



FIG. 194

Coke or Coal Charging Barrow

This barrow is built of No. 12 steel, $1\frac{3}{4} \times 1\frac{3}{4}$ inch, square axle, 36 inch wheels to run on roller bearings; it is frequently used in gas houses for charging.

No. 90. Capacity, 20 cubic feet; weight, 525 pounds \$100.00

OBERMAYER'S STEEL TRUCKS

No. 2

Full Length . . . 4 ft. 7 in.
 Width . . . 21 "
 Diameter of Wheel . . . $7\frac{3}{4}$ "
 Diameter of Axle . . . $\frac{7}{8}$ "
 Weight 75 lbs.

No. 3

Full Length 5 ft.
 Width 22 in.
 Diameter of Wheel . . . $8\frac{3}{4}$ "
 Diameter of Axle . . . 1 "
 Weight 90 lbs.

Same as No. 2 only of larger proportions.

Construction designed for strength and they are practically indestructible.



FIG. 195



FIG. 196
 No. 4 Barrel Steel Truck



FIG. 197
 No. 4 C Steel Truck

All Sizes for All Kinds of Work. Write for Prices

ONE PIECE STEEL "TOTE" BOXES

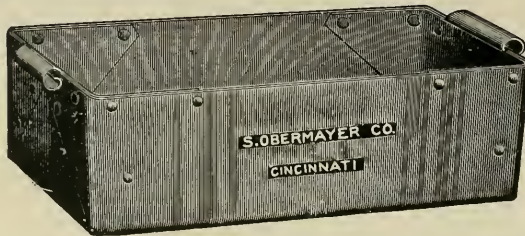


FIG. 198

The sides overlap the ends and the ends overlap the sides, making the corners and a portion of the sides and ends **DOUBLE THICK** and braced both ways.

The Box that is **DOUBLE THICK BOTH WAYS** at the **CORNERS** is the **LONGEST LIVED** in actual use or abuse.

ONE PIECE STEEL HAND BARROWS

With Vertical Sides and Ends

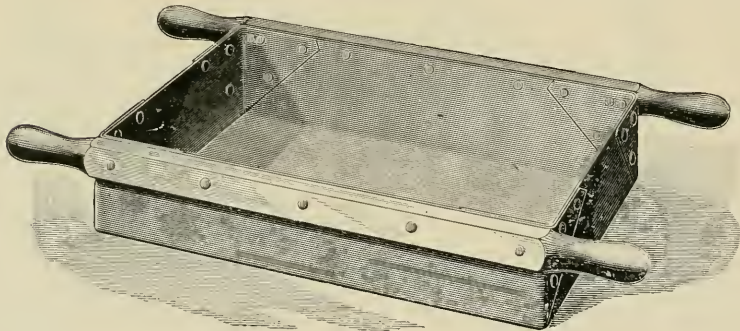
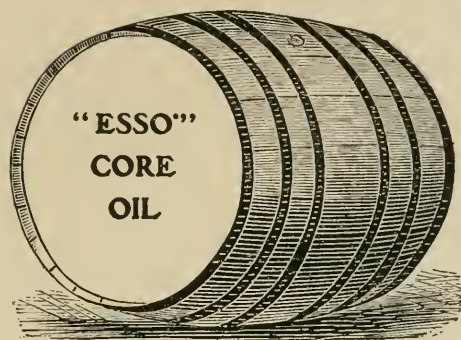


FIG. 199

An excellent substitute where wheelbarrows cannot be used. Light, but **STRONG** enough for a two man load. Two men can carry **TWICE AS MUCH** with this barrow as the same two can carry separately.

Special Catalogue of Tote Boxes sent on application.

Write for prices and sizes.



“ESSO” CORE OIL

THIS Core Oil is used with better success than other core mixtures put on the market.

It's the best and we guarantee it.

You can mix any reasonable amount of Esso Core Oil and use it from time to time as you require; it will retain its strength for sixty days after being mixed.

It's the cheapest core mixture you can use, All we ask of you is to use clean sand and as dry as possible, also free from loam and vegetable matter.

Esso Core Oil is a wonder and it will be to your interest to give it a good test.

In barrels	\$0.75 per gallon
In one-half barrels	1.00 “

We guarantee the Esso Core Oil to give satisfaction

Give it a trial

THE HAMMER CORE MACHINE

**Makes Any Size of Perfectly True Round Cores from
Three Eighths to Two Inches**

DESCRIPTION

It consists of a base with a bit-shaft and bit journaled and of an upright hopper, with central feeder-spindle geared down to the shaft. With each machine are furnished six core trays (for five cores each), one core bracket, ten bits as selected and ten core tubes.

For convenience in cleaning, the hopper of the Hammer Core Machine is made in two halves, one of which is detachable and is secured to the rigid half by means of two hinged bolts with winged nuts.

CAPACITY

The Hammer Core Machine turns out one core of any of the previously mentioned sizes and of 18 inches length in less than half a minute. After making liberal allowances for loss of time it means

Two Hundred Feet of Core in One Hour

THE HAMMER CORE MACHINE

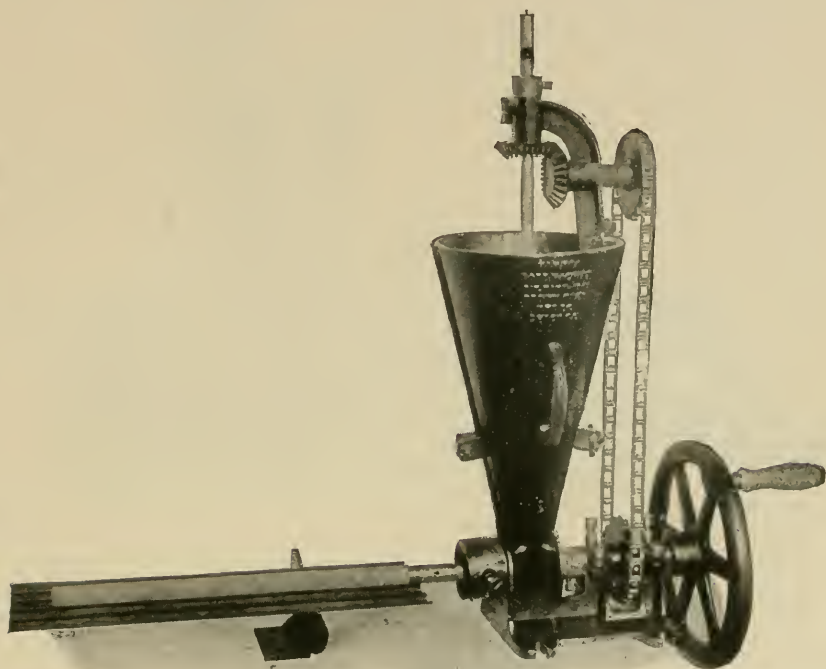


FIG. 200

No core boxes required.

No ramming of sand by hand.

No possibility for uneven vent holes as when hand made

No paste used for fastening each half, saving flour and time.

No trimming or filing of cores.

Only half the even space needed as with pasted cores.

Less breakage, as cores are one piece and therefore stronger.

Permanently true diameter and roundness, these features not depending on skill of coremaker.

Better work for your customer.

Larger output and smaller cost of production than with any device ever employed for this purpose.

Less fuel required to bake cores because sand is used almost dry.

THE HAMMER CORE MACHINE

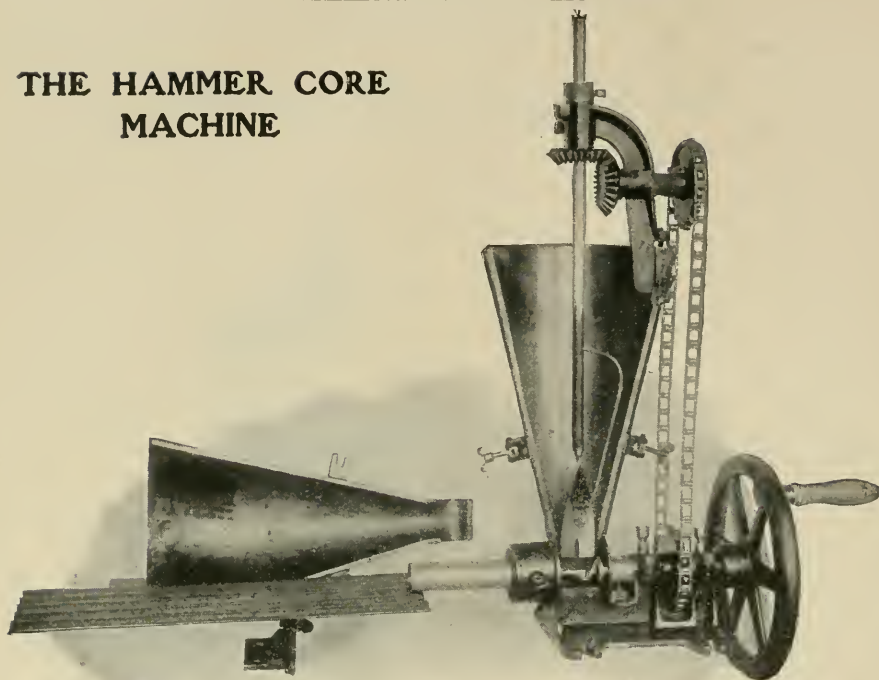


FIG. 201



FIG. 202

Samples of Cores Made on Hammer Core Machine



FIG. 203

The Hammer Core Machine Makes Accurate Cores Only

THE HAMMER CORE MACHINE

Directions

The Best Results are Obtained with a Sand Mixture Prepared as Follows :

SIX QUARTS OF CORE SAND
ONE QUART OF FLOUR
ONE GILL OF RAW LINSEED OIL

thoroughly mixed and sifted, as customary. The tempering of the mixture must be done judiciously and in a measure as indicated by the conditions of the sand and as taught by experience. A little practice will readily overcome any difficulties which may be encountered in this respect at the beginning. The **proportions** of the mixture can be varied considerably, depending upon for what the cores are to be used. Start with the sand almost dry and gradually temper it until you learn the right combination.

Place the Proper Size of Tray

under the end of tube, so that it forms a straight path for the issuing core to travel. Core tray must be horizontal. This is obtained by means of the adjustable tray bracket in line with the tube and secured to the same bench. Now turn the crank always in a right hand direction. Keep core trays free from rust.

NOTE.—After each day's use, the hopper and all internal mechanism must be cleaned, also the core tubes and core trays.

MECHANICAL POWER

If it is desired to operate the Hammer Core Machine by other than hand power, a *pulley* of proper size may be substituted for the crank. We will furnish this for \$2.50 extra. The machine consumes but little power and should run about 80 revolutions per minute. The change from one size of core to any other size requires but a few moments.

PRICE

The Hammer Core Machine complete, with ten bits, as selected, ten core tubes, six trays, one tray bracket, crank wheel, ready to operate, boxed, F. O. B. Chicago	\$75.00
Extra Tubes, each	2.50
Countershaft	8.00

You can save from \$1.00 to \$5.00 daily, depending on your consumption of cylindrical cores, if you use a Hammer Core Machine.

Why Not Let Us Send You One

PROCLAMATION

GIVING MORE
LIGHT TO

BRASS AND ALUMINUM FOUNDERS

Regarding Supplies and Equipments



WE handle in stock, ready for immediate shipment, all and everything that you require for a **modern and up-to-date Brass or Aluminum Foundry.**

We are the only Concern in the United States who **carry all sizes Iron Flasks in stock.**



**"Everything You Need
in Your Brass
Foundry"
and the Best
at That**



THE LUNKENHEIMER METAL MELTING FURNACE

Used in Connection with "Kirkwood" Fuel Oil Pumping, Heating and Regulating System

We can furnish a complete outfit for the melting of metals which includes Furnace, Air Tank, Blower, Oil Pump, Heating and Pressure Regulating System. Our experience in utilizing oil for fuel has proven very efficient and economical, and from which we are daily securing very good results. It is necessary to secure a system where the oil is heated before it enters the burners, when it is strained and free from lumps and foreign substances, and which can be regulated, having a continuously uniform pressure.

In figure No. 204 is shown a cut of the Kirkwood Oil Pump, which can be furnished with either single or double pumps, and may be equipped with same of two or three different capacities, thus giving a duplicate system. These pumps ordinarily have a greater capacity than is required, but can be throttled, so as to feed into a single furnace with complete success.

We accomplish a continuous and uniform pressure by supplying an equalizing tank with blower, and providing our pumping system with a very accurately designed and constructed overflow valve applied in such a manner that any oil which the pump supplies to the system above the immediate requirements of the burner is returned to the tanks without being heated. In order to obviate the clogging up of the burners with either foreign substances or clots in the oil, we have a special straining device which removes same before the oil is taken into the pump. The oil is heated by passing from the dome of the system, which coil is surrounded by the exhaust steam from the pumps, raising the temperature to the most desirable point. Thus we are enabled to heat the oil to proper temper-

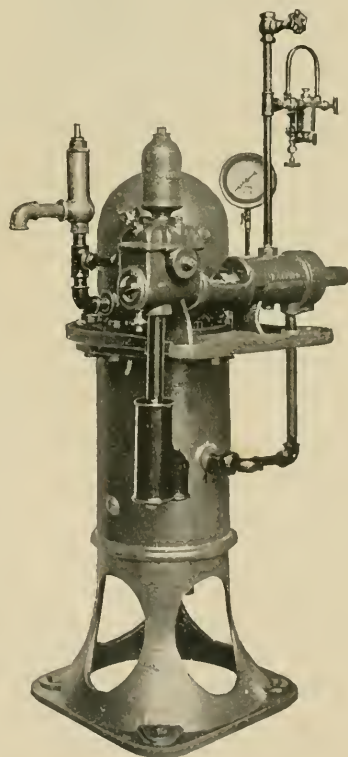


FIG. 204

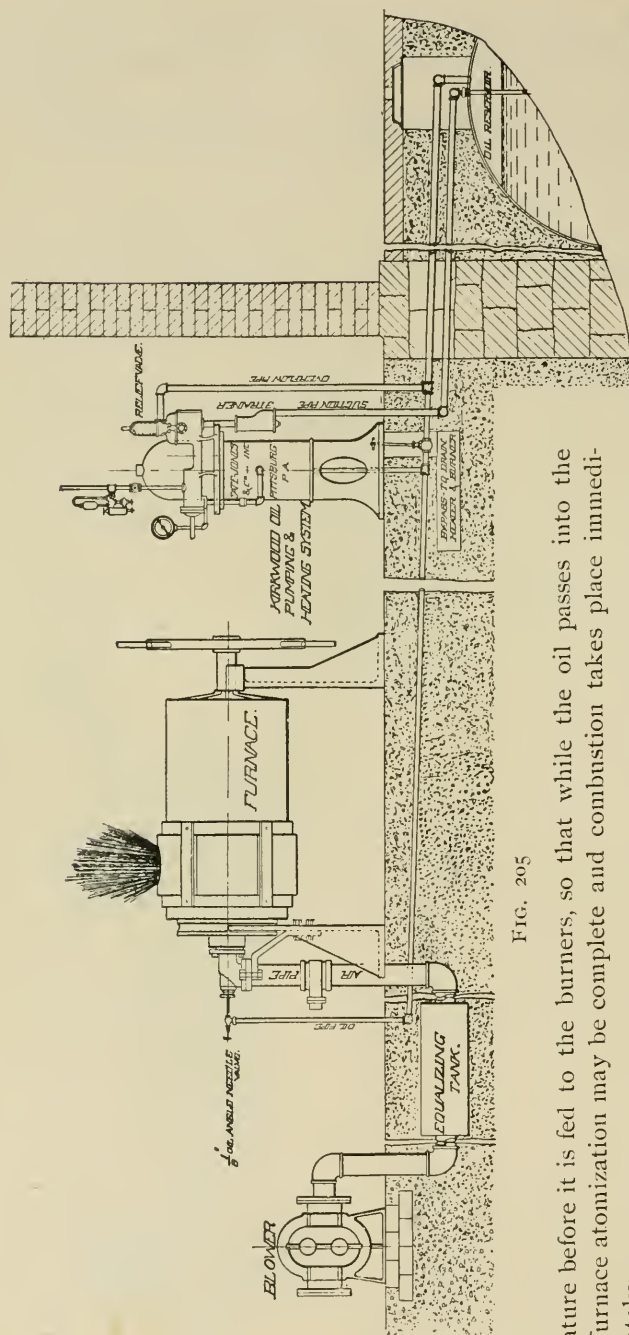


FIG. 205

ature before it is fed to the burners, so that while the oil passes into the furnace atomization may be complete and combustion takes place immediately.

In figure No. 205 is shown an outline of the proper connections and arrangement for installing a system of this kind. The by-pass is shown in the outline through which all surplus oil is drained back to the supply tank. These systems are in no sense an experiment, but are the results of careful thought, as the best engineering talent has been enlisted in perfecting not only this system as a whole, but in bringing each part up to the highest standard so that the heating coils, strainer, automatic pressure regulator and the over-flow of the piping arrangement are the most reliable, the simplest and most efficient for this purpose.

Prices Upon Application

THE LUNKENHEIMER METAL MELTING FURNACE

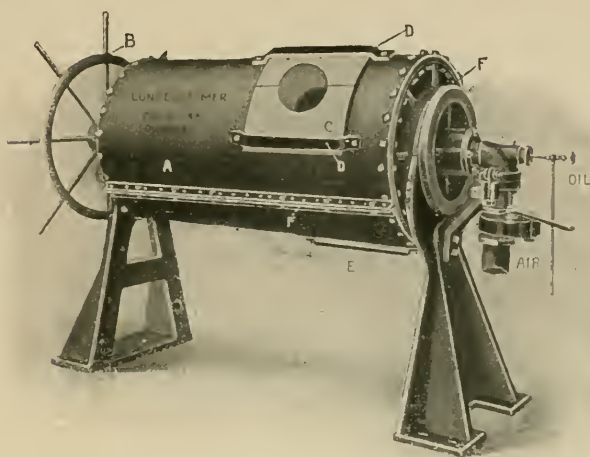


FIG. 206

We illustrate a view of The Lunkenheimer Metal Melting Furnace, which has been found to afford a very efficient and economical method of melting metals, particularly brasses and bronzes.

This type of furnace was evolved after considerable experimenting with nearly every type of furnace on the market, and is the result of considerable study on this subject, as will be seen from the cut above. The furnace consists of a cylindrical sheet steel drum "A," having cast iron heads. The interior of the drum is lined with fire-proof tile, and there are two openings on opposite sides of the drum. Only one of these openings is in use, the other being closed by a fire clay filling. The object of having two openings is to increase the life of the lining of the furnace. It has been found that the furnace wears out quicker around the filling hole (which also serves as an outlet for the flame) than elsewhere. The advantage that the Lunkenheimer Metal Melting Furnace has over all other makes is that when one filling hole is worn out, it can be closed by a fire clay filling and plate, the drum reversed, and the other hole cut out and put in service.

The oil burner is of a special type designed to give the greatest amount of heat with a minimum consumption of oil. In the Lunkenheimer foundry there are ten of these furnaces in use, and they are able

to secure from six to seven heats per working day of ten hours from each furnace. The weight of each heat will average about five hundred and fifty pounds, and the oil consumption varies from two to two and one-half gallons of crude oil per hundred pounds of metal melted.

The life of the linings is from three to four hundred heats, this varying with the kind of metal melted. The whole furnace is of a heavy and substantial construction, and will be found very durable. On account of the simple form of the tile it is very easy to re-line, an advantage which is not found in other types of furnaces.

The furnace is manufactured in two halves, and being cylindrical in shape the lining can be easily replaced when worn out, at a minimum cost.

With the first furnace sold to each customer within the radius of one thousand miles of Cincinnati we will send an expert to start the furnace and take off the first heat and instruct the furnace room employees as to how to secure best results in handling, etc.

This furnace is made in two sizes, the No. 1 size having a capacity of five hundred and fifty pounds of metal per heat, and the No. 2 size having a capacity of twelve hundred pounds of metal per heat.

We would be pleased to figure on complete equipment, and, on account of our extensive experience, are confident that we can produce better results than any other type of oil furnace.

We solicit further correspondence, and cheerfully give prices upon application.

PARTING CHARCOAL

**We Make a Specialty of PARTING CHARCOAL for use
in BRASS FOUNDRIES**

**We Recommend Using a Suitable Bag, Dusting the PARTING CHARCOAL
Sparingly on the Pattern**

Many Brass Foundries use our granulated CHARCOAL, placed in top of Crucibles on various kinds of metals when melting, which causes oxidation.

Packed in barrels about 200 pounds each.

Price, 3 $\frac{1}{2}$ Cents Per Pound

NATURAL DRAFT BRASS FOUNDRY FURNACES



FIG. 207

This cut represents Standard Construction Circular Brass Furnaces with Steel Shell, fitted with solid one-piece Cast-iron Dumping Grate. These can be furnished with Dome Covers if so desired.

No.	For Crucibles.	APPROXIMATE SIZE.		Prices Complete with Brick Lining.
		Diameter.	Inside Height.	
1	No. 10 to No. 20	20 inches.	21 inches.	\$30.00
2	No. 25 to No. 30	23 "	24 "	34.00
3	No. 35 to No. 60	26 "	27 "	46.00
4	No. 70 to No. 100	32 "	36 "	60.00

Furnaces, as well as extra Grates, Covers, or complete Fire Brick Linings, always in stock ready for shipment.

BRASS FOUNDRY FURNACES

Forced Draft

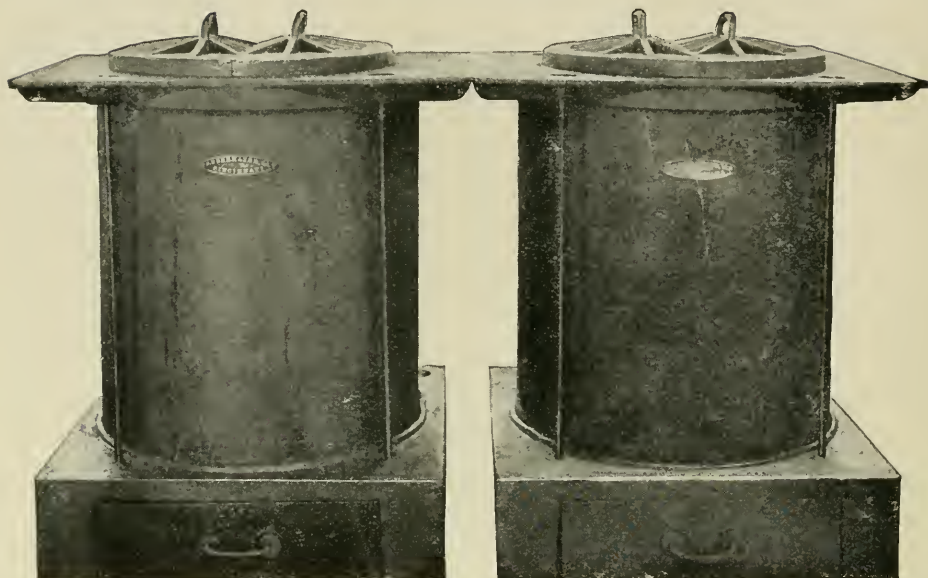


FIG. 208

Furnaces for Forced Draft, Cast Iron Dumping Grates

These Furnaces are so constructed that they can be arranged in batteries.

The covers can be furnished in *Dome Shape*.

Table of Sizes

No.	For Crucibles,	Diameter,	Height (Inside)	Price Complete with Brick Lining.
1	Nos. 10 to 30	20 inch.	21 inch.	\$38 00
2	Nos. 35 to 60	23 "	24 "	42.00
3	Nos. 70 to 100	26 "	27 "	58.00
4	Nos. 125 to 300	32 "	36 "	70.00

Specify whether *forced* or *ordinary* draft will be required.

Standard furnaces are designed for 3-inch linings.

We carry all sizes of the above in stock, and can fill all orders promptly; also linings for same in 3-in. or 4½-in. thickness.

BRASS FURNACE LININGS

Made to Fit Brass Furnaces and to Render the Best Service.

We have the following linings in stock :

Furnace No. 1.	20-in. shell,	14-in. inside diameter,	2 courses,	21-in. high
"	" 2.	23	" 17	" 3
"	" 3.	26	" 20	" 3
"	" 4.	32	" 26	" 3
"	" 4.	32	" 26	" 4
				" 24
				" 27
				" 30
				" 36

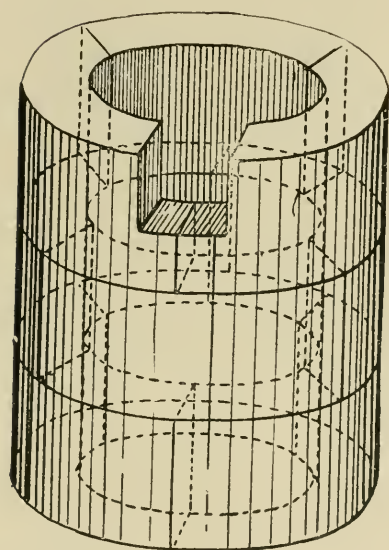


FIG. 209

Prices Per Set

No. 1	\$4.00
No. 2	4.50
No. 3	5.00
No. 4	5.50
No. 4—36-in.	6.00

Standard *three-inch* thickness lining will be furnished on all orders, unless otherwise specified.

In addition to the above Brass Furnace Linings we handle a large assortment of other sizes and shapes to fit almost any furnace.

Special sizes made to order on short notice.

Linings made to fit your Furnaces

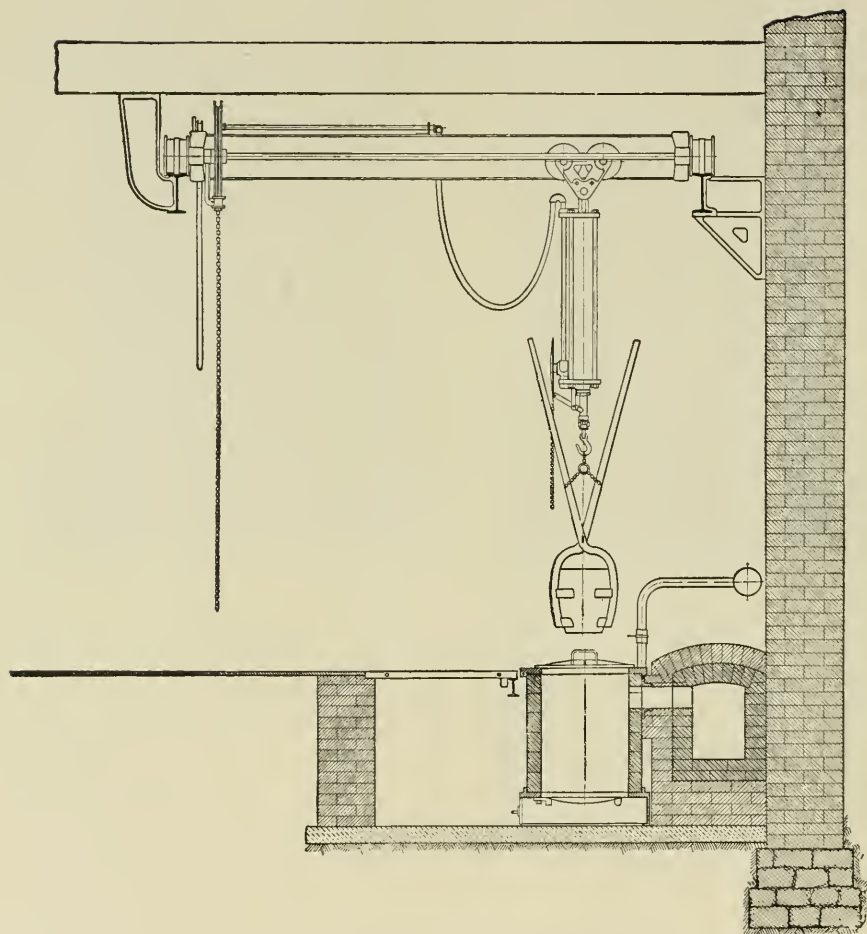
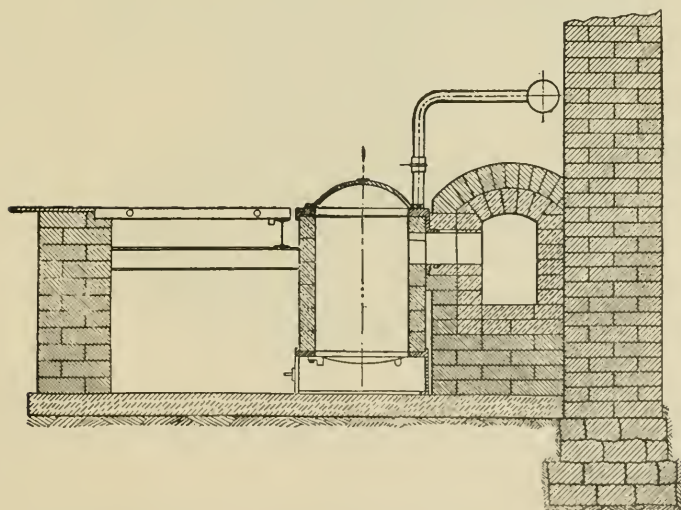
BRASS FOUNDRY EQUIPMENT

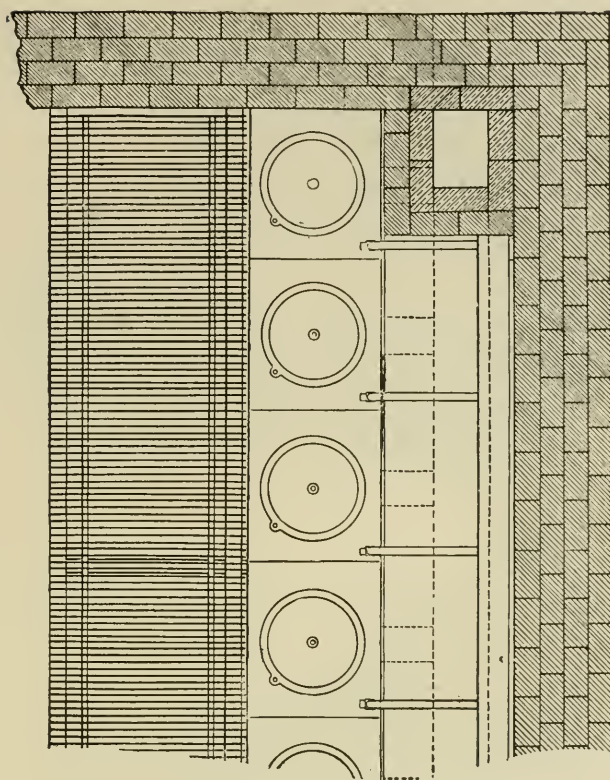
FIG. 210

Installation of Brass Furnace Plant, Showing Crane

We make a specialty of furnishing complete outfits for brass foundry plants, including furnaces, blast pipes, gratings, structural work for pits and cranes required. Drawings will be prepared showing method of installation where orders are given for entire plant.



SECTIONAL ELEVATION



PLAN

FIG. 211

ARRANGEMENT FOR BATTERY OF BRASS FURNACES

INGOT MOLDS

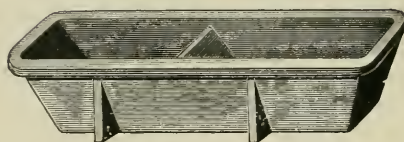


FIG. 212

Malleable Iron

Size, inside measure, $13 \times 3\frac{1}{2} \times 2\frac{1}{2}$ inches \$2.00 each

BRASS FOUNDERS' SPILL TROUGH

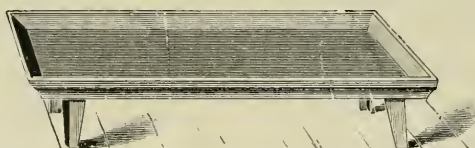


FIG. 213

No. 1. Height, 10 inches; length, 74 inches; width, 14 inches \$13.50 each

No. 2. " 10 " " 74 " " 24 " 26.00 "

BRASS FOUNDERS' DRYING STOVES

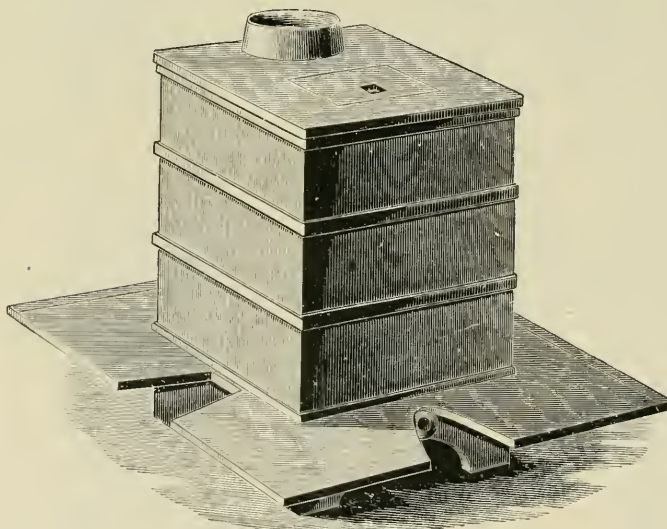


FIG. 214

Whole height, 28 inches; squares, 15×15 inches; sections, each 6 inches; flanges at bottom, 7 inches.

In three sections, bottom and top complete. The top fits any section and the sections fit into each other.

Price, \$48.00

"Everything You Need in Your Brass Foundry"

BRASS MOLDERS' IMPROVED RIBBED AND BEVELED FLASKS



FIG. 215

REGULAR PLAIN BEVELED IRON FLASKS

Always On Hand Ready For Shipment

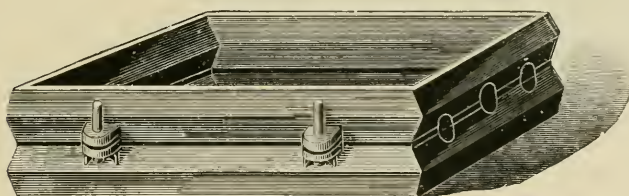


FIG. 216

These Sizes Always in Stock (Inside Measure)

Width.	Length.	Depth of Whole Flask.	Price Per Flask.
12 $\frac{1}{2}$ in.	18 in.	6 in.	\$ 6 50
12 $\frac{1}{2}$ "	18 "	5 "	6 00
11 "	16 "	5 "	5 00
11 "	16 "	4 "	5 00
11 "	14 "	5 "	5 00
11 "	14 "	4 "	5 00
10 "	15 "	5 "	5 00

Other sizes and styles made to order on short notice.

See pages 154 and 155.

Obermayer's Crucible Tongs are Safe and Strong

PATENT IMPROVED RIBBED AND BEVELED FLASKS

Width.	Length.	Depth of Whole Flask.	Price Per Flask.	Width.	Length.	Depth of Whole Flask.	Price Per Flask.
8 in.	8 in.	6 in.	\$ 5 00	12 in.	16 in.	5 in.	\$ 5 50
8 "	20 "	26 "	7 00	12 "	16 "	5½ "	5 50
8 "	40 "	5 "	9 50	12 "	16 "	6 "	6 00
9 "	12 "	7¼ "	6 00	12 "	16 "	7 "	6 00
9 "	12 "	4 "	4 00	12 "	16 "	8 "	7 00
10 "	12 "	5 "	4 50	12 "	16 "	9 "	10 00
10 "	12 "	6 "	5 00	12 "	17 "	3 "	5 50
10 "	12 "	9 "	6 00	12 "	30 "	5 "	9 50
10 "	15 "	4 "	5 00	12 "	30 "	6 "	9 50
10 "	15 "	5 "	5 00	12 "	30 "	7 "	10 00
10 "	15 "	6 "	5 50	12 "	36 "	5 "	11 00
10 "	17 "	6 "	6 00	12½ "	18 "	4½ "	6 00
10 "	17 "	7 "	6 50	12½ "	18 "	5 "	6 00
10 "	17 "	8 "	7 00	12½ "	18 "	5½ "	6 50
10 "	18 "	6 "	6 50	12½ "	18 "	6 "	6 50
10 "	27 "	5 "	8 50	12½ "	18 "	6½ "	6 50
10 "	27 "	6 "	8 50	12½ "	18 "	7 "	7 00
10 "	27 "	7 "	9 00	12½ "	18 "	8 "	8 00
10 "	27 "	8 "	9 00	12½ "	18 "	9 "	8 50
11 "	14 "	4 "	5 00	12½ "	18 "	10 "	9 00
11 "	14 "	4½ "	5 25	12½ "	18 "	12 "	10 00
11 "	14 "	5 "	5 00	12½ "	20½ "	5 "	6 50
11 "	14 "	5½ "	5 25	12½ "	20½ "	5½ "	6 75
11 "	14 "	6 "	5 50	12½ "	20½ "	6 "	7 00
11 "	14 "	8 "	6 50	12½ "	20½ "	6 "	7 00
11 "	15 "	4 "	5 00	12½ "	20½ "	7 "	7 50
11 "	16 "	4 "	5 00	12½ "	20½ "	8 "	8 50
11 "	16 "	5 "	5 00	12½ "	20½ "	9 "	9 50
11 "	16 "	5½ "	5 25	12½ "	20½ "	10 "	10 50
11 "	16 "	6 "	5 50	13 "	16 "	5 "	7 00
11 "	16 "	6½ "	5 75	13 "	16 "	5½ "	7 00
12 "	12 "	6 "	6 00	13 "	16 "	6 "	7 00
12 "	12 "	8 "	6 00	13 "	16 "	8 "	7 50
12 "	12 "	9 "	7 00	14 "	18 "	5 "	7 00
12 "	12 "	9½ "	9 00	14 "	18 "	6 "	7 50
12 "	12 "	12 "	10 00	14 "	18 "	7 "	8 00
12 "	14 "	4 "	5 00	14 "	18 "	10 "	9 00
12 "	14 "	5 "	5 00	14 "	20 "	5 "	7 50
12 "	14 "	6 "	5 50	14 "	20 "	6 "	8 00
12 "	14 "	8 "	6 50	14 "	20 "	7 "	8 50
12 "	16 "	4 "	5 00	14 "	20 "	7½ "	8 50
12 "	16 "	4½ "	5 25	14 "	20 "	8 "	9 00

Write for our special catalogue of Brass Foundry Equipments
and Supplies.



FIG. 217

CIRCULAR RIBBED FLASKS

We can furnish these in either two or three parts. Full dimensions should be given when order is placed or when inquiring for prices.

STRAIGHT SIDE FLASKS (END HOLES)

**Beads at Top,
Bottom
and Parting**

(Inside Measure)

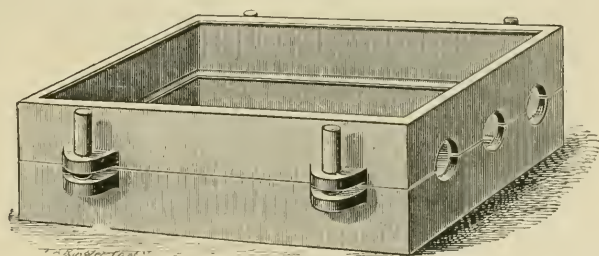


FIG. 218

Our flasks all fit perfectly. No rocking.

These are made in same sizes as Beveled and Ribbed Flasks listed on pages 153 and 154. Flasks with Beads at parting only, supplied when so ordered.

WOOD MOLDING BOARDS

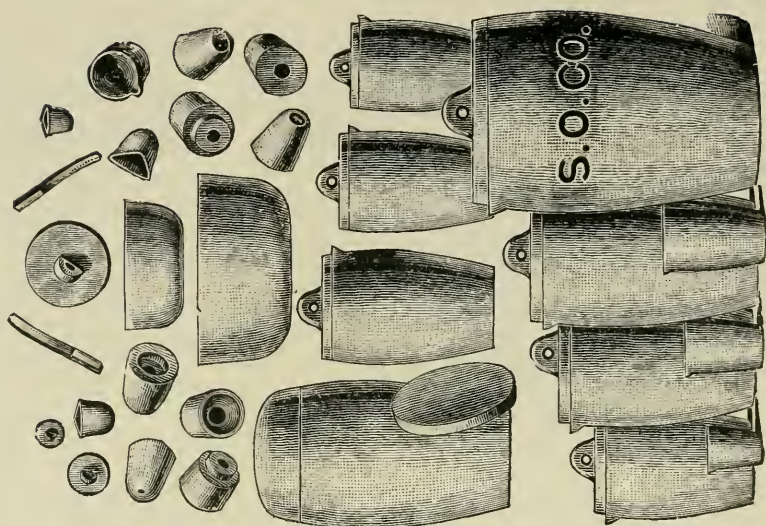
Smooth and level, hard wood ends, tongued and grooved, $1\frac{1}{8}$ -in. thick, any size to order.



FIG. 219

Prices on Application

SIZES OF Obermayer's Crucibles.



Nos.	Holding Capacity Liquid Measure			Height Outside	Diameter at Top Outside	Diameter at Bilge Outside	Diameter at Bottom Outside	Prices.
	GAL.	QT.	PT.	INCHES	INCHES	INCHES	INCHES	
0				2	1½	1½	1¼	15 cents each
00				2⅜	1⅞	1⅞	1⅜	15 " "
000				2½	1⅞	2½	1½	15 " "
0000				3	2⅜	2½	1¾	15 " "
1				3⅝	3⅞	3	2¼	20 " "
2				4½	3¾	3⅝	2¾	25 " "
3				5¼	4¼	4⅞	3	30 " "
4				5⅝	4⅝	4½	3¼	35 " "
5			1½	6	4⅞	4¾	3½	40 " "
6		I		6½	5¼	5⅞	3¾	45 " "
7		I	¼	6¾	5½	5½	4	50 " "
8		I	½	7¼	5¾	5¾	4¼	55 " "
9		I	¾	7⅝	6	6¼	4½	60 " "
10		I	I	8	6	6½	4¾	65 " "
12		2		8	6¼	6¾	5	No. 12 and upwards 6½ cents per number.
14		2	I	8½	6¾	7¼	5½	
16		2	I	8¾	7	7½	5½	
18		3	I	9¾	7⅝	8	5¾	
20	I			10¼	7¾	8⅝	6	
25	I	I		10¾	8	8⅝	6¼	
30	I	I	I	11	8⅝	9¼	6½	
35	I	2	I	11⅝	9¼	9¾	7	
40	2			12⅜	9¼	10¼	7¾	
45	2	I		13	9¾	10½	7⅝	
50	2	3		13½	10⅞	11¼	7⅞	
60	3			14	10⅝	11⅝	8	
70	3	I		14½	10⅞	12	8¼	
80	3	2	I	15⅝	11⅞	12⅝	8⅝	
90	4			15⅞	11½	12½	9	
100	4	2	I	16	11⅞	13⅞	9⅝	
125	4	3	I	16⅝	12½	13¾	9½	
150	6	3		18¼	13¼	14¾	10⅝	
175	7	3	I	19½	14¼	15¾	10¾	
200	9	3	I	20½	15	16½	11¼	
225	10	I	I	20¾	15¼	16¾	12½	
250	10	3		20½	15¼	17	11¾	
275	11	3		22⅝	15	16⅝	12½	
300	12	2		22	16¼	17½	12½	

Complete stock always on hand all sizes Crucibles and Covers.

BRASS MOLDERS' PICK-UP TONGS

We supply the trade with Pick-up Tongs that are carefully made from the best forged material and by skilled workman. They are hand-made, with a liberal factor of safety throughout their construction in order to guard against extra strain while in use. We guarantee them to give satisfaction in every respect.

Special sizes made to order upon receipt of drawings or specifications. Prices on application.

Standard sizes in stock.



FIG. 220

SHAKE-OUT TONGS



FIG. 221

Wrought Iron, 18 inches long \$12.00 per doz.

Cast " 18 " " 9.00 "

CRUCIBLE TONGS AND SHANKS

For Handling Crucibles in Brass Foundries
Improved Patterns

No.	Sizes of Crucibles Intended For.	Price Each, Tongs or Shanks
1	Nos. 1 and 2	\$ 3 50
2	" 3, 4, 5	4 00
3	" 6, 7, 8	4 50
4	" 9, 10, 12	5 20
5	" 14, 16, 18	6 00
6	" 20 and 25	6 80
7	" 30 and 35	7 50
8	" 40 and 45	9 00
9	" 50 and 60	11 50
10	" 70, 80 and 90	14 00
11	" 100 and 125	16 50
12	" 150	18 00
13	" 175	20 00
14	" 200 and 225	21 50
15	" 250	23 00
16	" 300	25 00

Specify number of Crucible to be used
when ordering.



FIG. 222



FIG. 223

WOODEN FLASK CLAMPS

For Iron Flasks

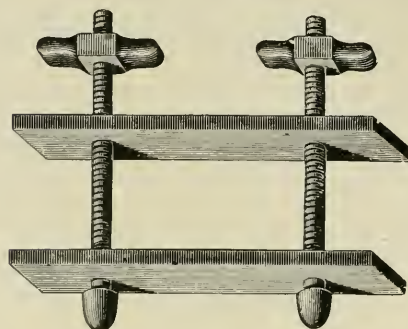


FIG. 224

- | | | |
|--------|---|------------------|
| No. 0. | Bars 12 in. between Screws, $2\frac{1}{2}$ in. wide, 1 in. thick, Screws 15 in. under head, 1 in. diameter, nuts 6 in. long | Per doz. \$14.00 |
| No. 1. | Bars 16 in. between Screws, $2\frac{3}{4}$ in. wide, $1\frac{1}{4}$ in. thick, Screws 16 in. under head, $1\frac{1}{4}$ in. diameter, nuts 6 in. long | Per doz. 18.00 |
| No. 2. | Bars $16\frac{1}{4}$ in. between Screws, $2\frac{3}{4}$ in. wide, $1\frac{3}{8}$ in. thick, Screws 16 in. under head, $1\frac{1}{2}$ in. diameter, nuts $8\frac{1}{2}$ in. long | Per doz. 27.00 |
| No. 3. | Bars 22 in. between Screws, $2\frac{1}{2}$ in. wide, $1\frac{1}{2}$ in. thick, Screws 16 in. under head, $1\frac{1}{2}$ in. diameter, nuts $8\frac{1}{2}$ in. long | Per doz. 27.00 |

Any length or width clamp can be made to order using same diameter screws and nuts as in number one clamps.

MORTAR AND PESTLE

No. 8. Capacity, 1 gallon; diameter over top, $9\frac{1}{2}$ inches; depth inside, 9 inches; price, \$6.50.

No. 9. Capacity, 2 gallons; diameter over top, 11 inches; depth inside, 8 inches; price, \$8.50.

No. 10. Capacity, $3\frac{1}{2}$ gallons; diameter over top, $13\frac{1}{2}$ inches; depth inside, 12 inches; price, \$18.00.

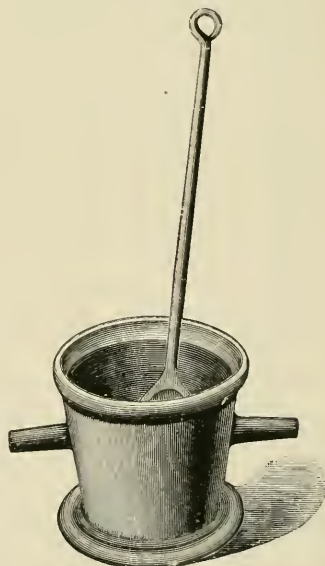
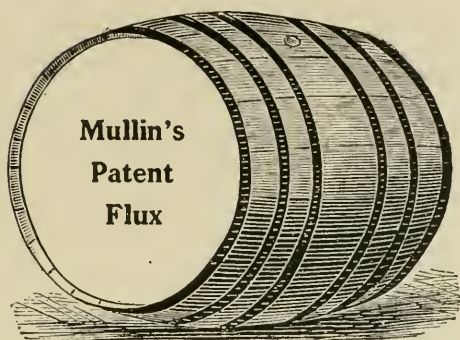


FIG. 225



MULLIN'S PATENT FLUX

**For Cleansing and Fluxing
Scrap Brass**

Melters of copper, brass, bronze, German silver, aluminum and alloys will find it a great help in melting, as the time is lessened considerably. It increases the fluidity of the metal, removes the oxide, and cleanses the metal from dross and impurities. It eliminates the gases, makes the product free from the usual porosity, and increases the electrical conductivity. In melting emery dust, buffings or burnt skimmings, results are very satisfactory, the product being clean and the slag free from metal.

Price, 25 Cents per Pound

Directions

For ordinary *clean* metals, alloys, copper, brass, bronze, etc., use one percent Flux.

For German silver, use five percent Flux.

For pure copper or electrical work, use seven percent Flux.

In charging Flux for above, stir in twenty minutes before pouring. ⁴

In cleansing and refining emery dust, buffings and burnt skimmings, mix from five to eight percent of the Flux with metal before charging.

Note

Iron and steel will not melt at the same temperature as will copper, brass, etc., but may be removed with the slag by skimming if properly separated; Mullins Patent Flux will do this work.

BRASS MOLDING SAND

In Barrels Containing About 375 Pounds

Albany Sand	\$2.50 per Barrel
Newport Sand	2.25 "
Zanesville Sand	2.25 "
Windsor Lock Sand	4.50 "

Special Price in Ton and Carload Lots

OBERMAYER'S NEW PROCESS PEERLESS FACING SAND

For Special Fine Brass and Bronze Castings

In use in almost every Brass or Bronze Foundry making fine ornamental castings.

Price, \$4.50 per Barrel

CONNELLSVILLE COKE

Crushed egg size, no waste. Just right for Brass Foundries.

Guaranteed 72-hour Connellsville Coke.

Lowest Market Prices

Use Our Special Brass Facing for Making Brass Castings

MILLETT PATENT CORE OVEN

Portable Style

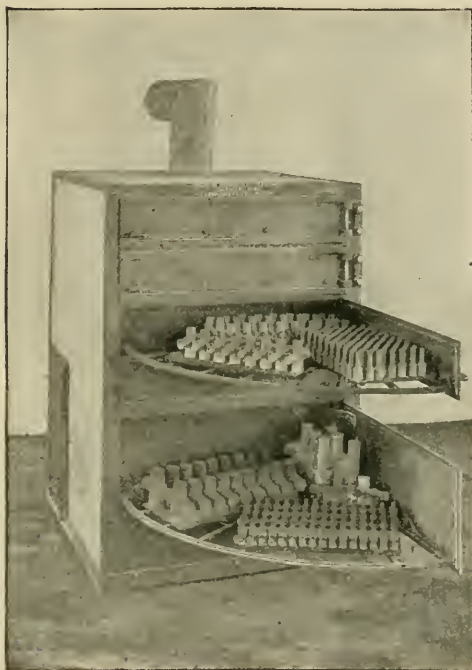


FIG. 226

Double Doors, one closing the oven when the other is open. Hundreds in use now. All modern Foundries use them. **Saves time and fuel.**

The best Core oven on the market for small cores.

Price of Portable Oven, \$250.00

750 now in daily use. If interested we will give names of firms using them.

MILLETT PATENT CORE OVEN

Stationary Style

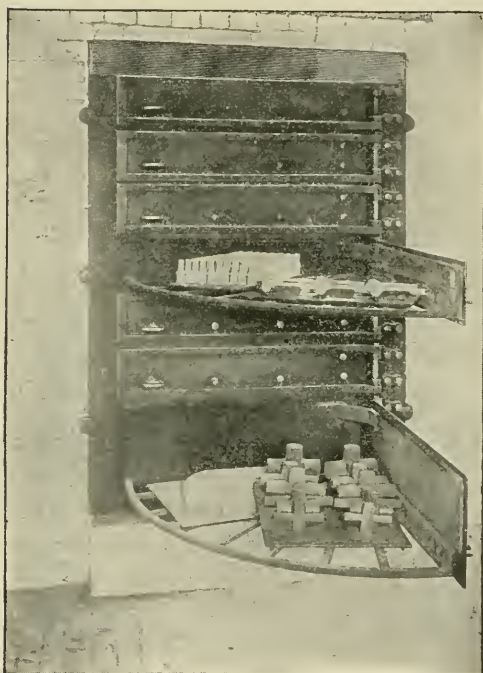


FIG. 227

Illustration Shows Two Shelves Open, but Oven Retaining the Heat

No foundry making small cores can afford to be without it.

Ovens furnished with doors and shelves of different sizes, depending upon dimensions of the cores to be dried.

This illustration shows the Stationary Stock Size, permanently located and supported by brick work.

Price of Stationary Oven, \$300.00

Write for Special Catalogue and list of foundries that have
Millett Ovens in use.

WATER TUMBLERS OR SMALL TUMBLERS FOR BRASS WORK, ETC.

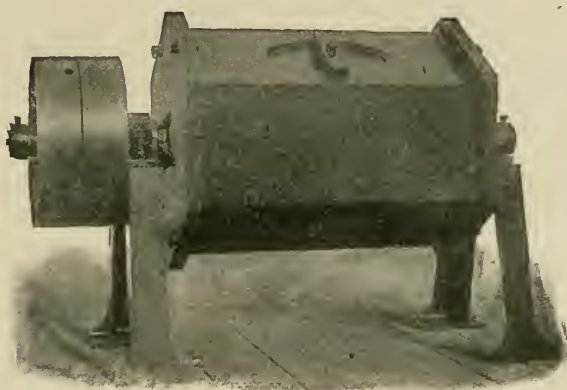


FIG. 228

We manufacture the following line of Tumblers for light work, driven by direct tight and loose pulleys. When not otherwise ordered, a dry tumbler is supplied. With the wet tumbler a trough is supplied for attachment to standards under the barrel. The barrel is cast solid, access being by means of a manhole.

List

No.	Diameter of Barrel, Inside.	Length of Barrel, Inside.	Floor Space.	For Dry Rattling Price each.	For Wet Rattling with Trough
100	16 in.	28 in.	3 x 4 ft.	\$100.00	\$113.00
102	20 "	32 "	3 x 4½ "	120.00	134.00

1000 of These Now in Use

**INVESTIGATE OUR SPECIAL BRASS MOLDING SAND FOR FINE
ORNAMENTAL BRASS CASTINGS**

THE TODD RUMBLER.

The Most Satisfactory Water Rumbler Made for Cleaning
Brass Castings and Scrap Metals

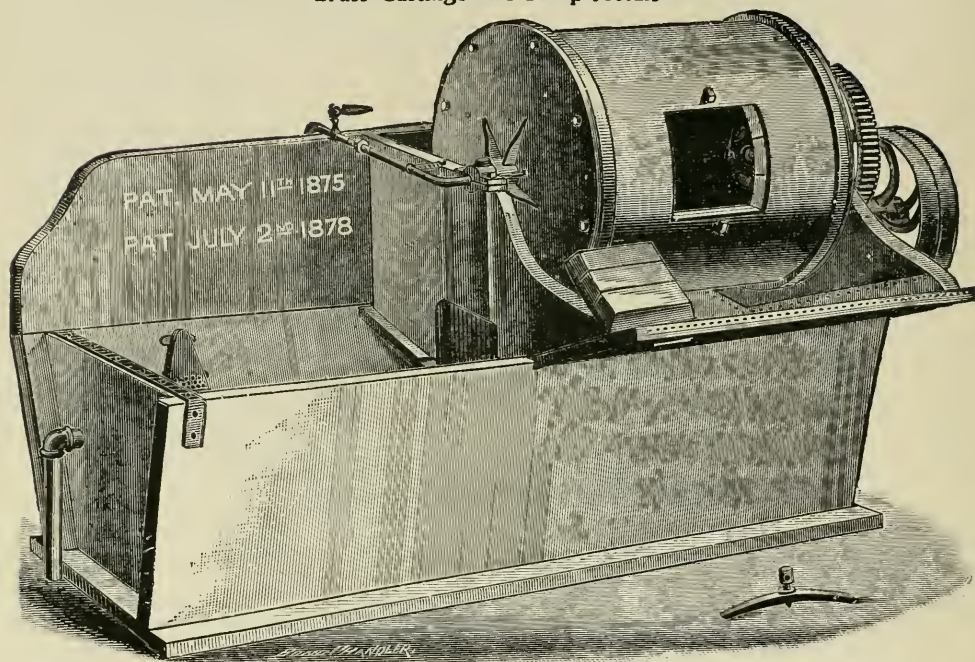


FIG. 229

This machine is used in most of the large Brass Foundries in the United States. It removes the sand absolutely from the cores of castings. It has no equal for effective work; the most delicate castings can be cleaned without injury to the fine points; tools are cleaned in this manner with great success. The door is easily removed, and the opening is large enough to permit the castings being readily placed in and out of the tumbler. It is provided with a lining, which, when worn out, can be replaced.

Foundry sweepings and skimmings are cleaned perfectly. We provide a trough which is used as an overflow, so that no metal can be wasted. Furnished with tight and loose pulleys which in many cases obviates a countershaft.

Floor space required, 4 x 6 feet; weight of machine, 1500 pounds. It requires $\frac{1}{4}$ to $\frac{1}{2}$ H. P. to operate the machine. Full instructions furnished when order is placed.

Price of machine complete with one set of lining . \$200.00

Price of Wooden lining per set extra 6.00

Write for Discount

METAL CUTTING SAW FOR BRASS SHOPS, ETC.

Eureka Band Saw Frame

This machine is designed expressly for cutting metals, and is operated in the same manner as a band saw for cutting wood.

The machine is strongly and substantially built, weighs 1,000 pounds, and has an iron table thirty inches square. The pulleys are thirty inches in diameter, driven by a four-cone pulley using a three-inch belt, and are geared back one to four. The gears are all machine cut, and are placed in the hollow of the frame, thereby protecting them from injury by dust or chips.

Two of Wright's band saw guides are used, one above and one beneath the table.

The pulleys are made of cast iron, without rubber, felt, etc., on the face, thereby allowing the use of oil for lubrication of the saws. The top pulleys have a lateral adjustment, the easier to manipulate the saw.

The feed guide bar can be raised so that work ten inches in height can be cut. The distance between the feed guide bar and frame is twenty-eight inches, thereby allowing a larger space for the convenient handling of work.

Length of saw used, 15 feet, 8 inches.

The countershaft has tight and loose pulleys, 8 inches in diameter, by $3\frac{1}{2}$ inch face, and should make 190 revolutions per minute.

Price, No. 1, Without Countershaft, \$175.00

Extra saws furnished at cost.

Use Our Special Brazing Machine For Repairing Saws

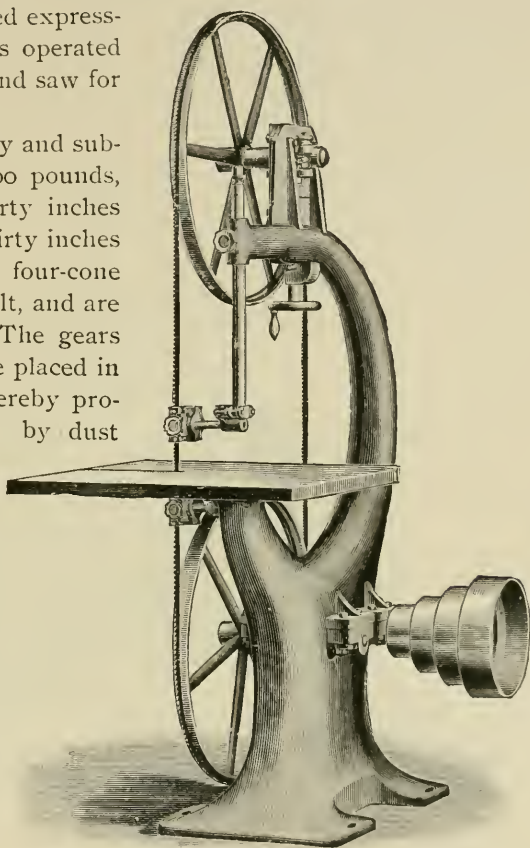


FIG. 230

LIST OF HACK SAWS.

5/8-in. wide,	.031	thick, about	16 ft.	per lb. at . . .	\$2.25	per lb.
1/2 " " "	.025	" " "	25	" " " at . . .	2.50	"
3/8 " " "	.025	" " "	35	" " " at . . .	3.50	"
1/4 " " "	.025	" " "	60	" " " at . . .	7.00	"

These will saw Hard Brass Gates from 1 1/2 to 2 inches, also 3-in. gates. One coil in 1 1/2-in. The length of saw for the standard frame is 17 ft. and 3 inches long.

OBERMAYER'S BRAZING MACHINE

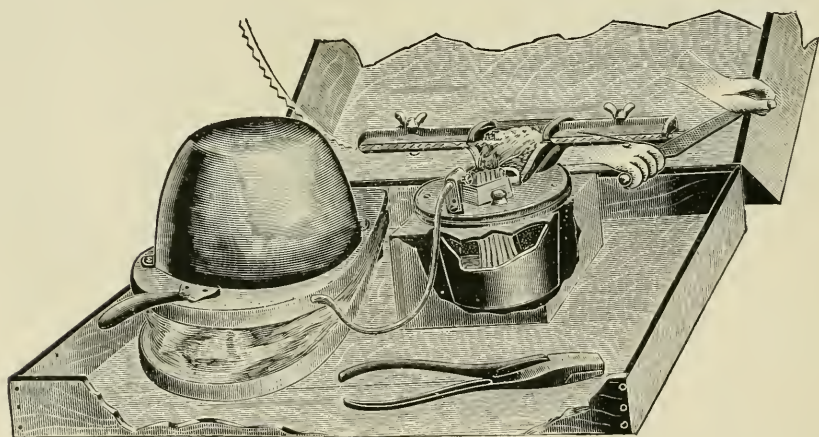


FIG. 231

The Price Can Be Saved Many Times

By repairing old saws. It is clean, with no danger of fire. Can braze a saw anywhere in thirty (30) seconds.

CAN WE SHIP YOU one of these machines, with the understanding that you can return it at our expense, and no charge will be made if you fail to find it a good investment?

Always in stock; can ship immediately.

Price of Machine Complete, \$40.00

SAWYER'S IMPROVED MAGNETIC METAL SEPARATOR.

For Separating Iron Turnings, Filings and Dust from Brass,
Composition Aluminum and Other Metals

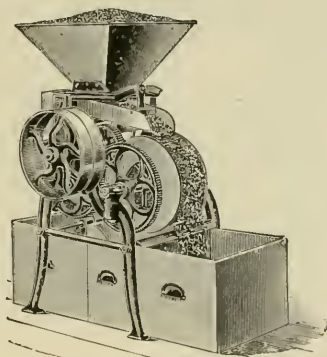


FIG 232

Recommended Where Electricity is Not Available

A machine that pays for itself in a very short time and which low price and competition compel one to purchase. It is a necessity in all well regulated establishments.

The wheel represented in the cut, over which the mixed metals fall, contains 360 magnets to which the iron adheres. The iron is carried to the brush cylinder on the rear side of the machine and there removed, while the brass and other materials fall into the box on the front side. Its capacity and utility for this kind of work surpasses anything heretofore offered, doing its work most thoroughly and with the least amount of labor and trouble. The machine pays for itself in a short time in the saving of labor effected by its use, to say nothing of the improved quality of stock thus treated. Brass stock cleansed with this machine can be used for the best kind of work.

No. 1.	Capacity, 1,500 lbs. 10 hrs.		\$270.00
No. 2.	" 3,000 " "		470.00
No. 3.	" 4,000 " "		670.00

Send for Special Catalogue

DING'S ELECTRO MAGNETIC SEPARATOR

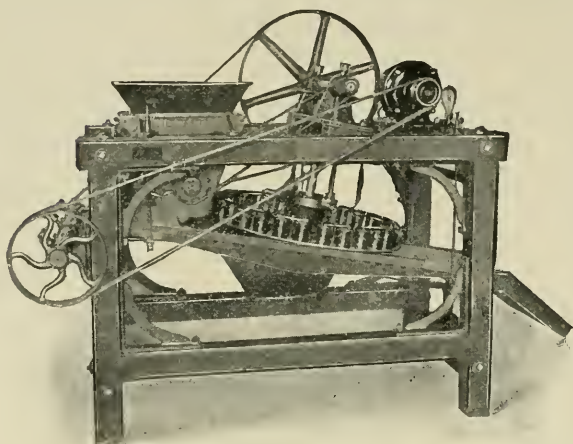


FIG. 233

(Type M with Dynamo Attached)

This separator, known as the "Disk Type," is used in brass foundries, smelting and refining works, etc. It has many important features not found in any other separator.

The metal to be separated is fed from a hopper to a conveyor and passes into a thin sheet under moving magnets, the conveyor motion and the sweep of the magnets being so adjusted as to bring every part of the stock TWICE within a strong magnetic field, which is equal to twice running the material through an ordinary separator.

The magnets are mounted upon a disk rotating over a conveyor vibrated by means of an eccentric on the driving shaft. The magnets are automatically controlled, so that while over the conveyor they are powerfully charged, but while not over the conveyor they are demagnetized, allowing the iron picked up to drop at the outside of the machine, leaving the magnets clean for the next revolution; thus no device is needed to knock off the iron.

The hopper is provided with a rotary feed and an auxiliary stirring shaft, which prevents any stoppage or choking up in the hopper, and feeds the stock onto the conveyor in a thin or thick layer, as desired. Adjustments are quickly made in changing to a finer or coarser grade of stock. A device under the shaker keeps the stock agitated so that no particles of iron can escape by being covered with heavy chips of brass.

A screen on the delivery end of the conveyor takes out the very fine part which usually contains more or less sand, dirt and scale off of cast-

ings, and separates it from the coarser and better stock. This fine stuff can be kept separate and used in a different grade of work. This feature is not found in any other separator.

As the iron is picked up without the magnets coming into direct contact with the mixed metals, much less chance is offered for mechanical entanglement than in other separators, consequently less waste of metal.

Every coil and electrical connection is at once accessible for inspection without taking the machine apart.

No. 2 Standard Size—capacity 400 to 1,500 pounds of metal per hour. Shipping weight 1,000 pounds. Speed 400 R. P. M. Driving pulley 12 inches in diameter. Floor space required 3 x 6 feet. Can be ordered for any direct current from 3 to 500 volts. Power required, both electrical and mechanical, about $\frac{1}{2}$ H. P. A switch and pilot lamp furnished with every machine.

Price F. O. B. factory	\$300.00
Dynamo, extra	60.00
Motor Drive, extra	75.00

Add 10 percent for voltage above 500.

No. 1 Pony Size—capacity 200 to 400 pounds of metal per hour. Shipping weight 450 pounds. Occupies a floor space 2 x 4 feet. Speed 400 revolutions per minute. Driving pulley 6 inches in diameter. Can be ordered for any direct current up to 500 volts. Power required, both mechanical and electrical, about $\frac{1}{4}$ H. P. Switch and pilot lamp with every separator.

Price F. O. B. factory	\$200.00
Dynamo, extra	60.00
Motor Drive, extra	60.00

Add 10 percent for voltage above 500.

LYCOPodium

A fine yellow powder made from spores of various species of Club-Moss. Used to prevent pattern from sticking to the mold, also in place of Parting Sand or Charcoal. This material is used extensively by manufacturers who make Fine Ornamental Brass Castings such as Chandeliers, Fine Brass Lamp Fixtures, and Fine Brass Work of all descriptions. It is rather expensive, but owing to its superior merit is used in preference to any other article known for the purpose.

Put up in 5-lb. Packages at Market Price

THE BADGER MAGNETIC SEPARATOR

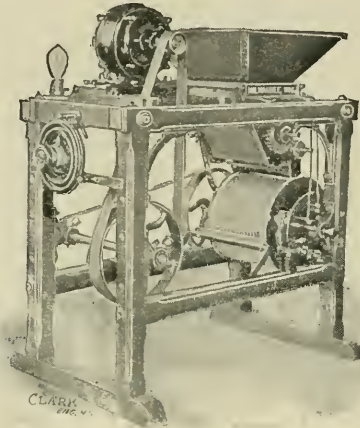


FIG. 234

(Type L—Dynamo Attached)

This is an electrically energized magnetic separator and embodies the best possible construction of the well-known drum type, and has several important features not found in other separators. The magnets are made of the best dynamo steel, the poll faces of which project through the rim of the drum, bringing the metal to be separated into direct contact with the magnets without the intervention of any brass covering. The rim of the drum is made of heavy cast brass, and will wear as long as any other part of the machine.

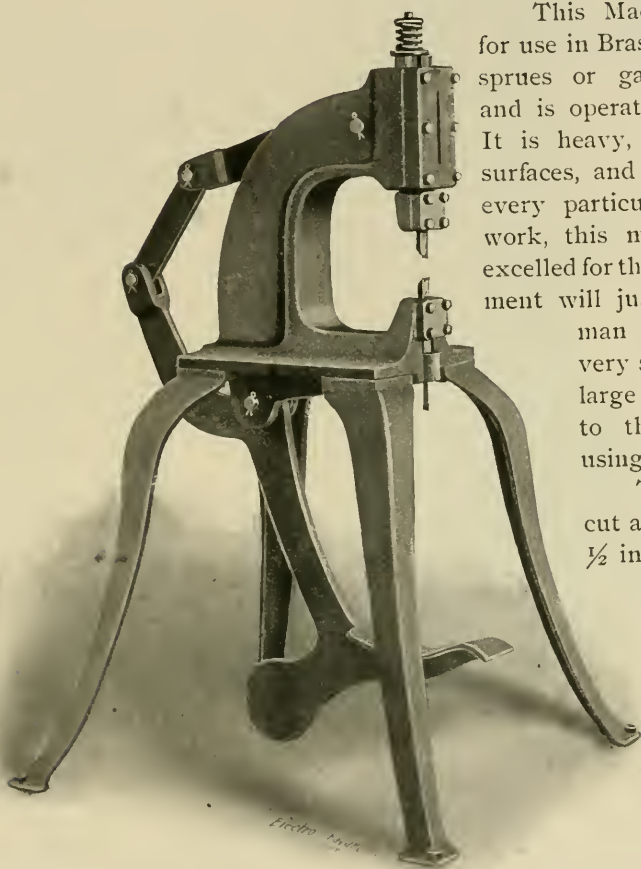
The machine takes but very little power and the electricity is applied in such a manner that the magnets successively discharge themselves at a given point, allowing the iron to drop without the necessity of a revolving brush or other device to remove the iron. A simple wiping brush removes the dust.

Capacity 300 to 1,000 pounds per hour. Can be wound for any direct current of electricity from 3 to 500 volts.

Price F. O. B. factory	\$300.00
With Dynamo attached	350.00

Add 10 percent for voltage above 500.

IMPROVED FOOT POWER SPRUE CUTTER



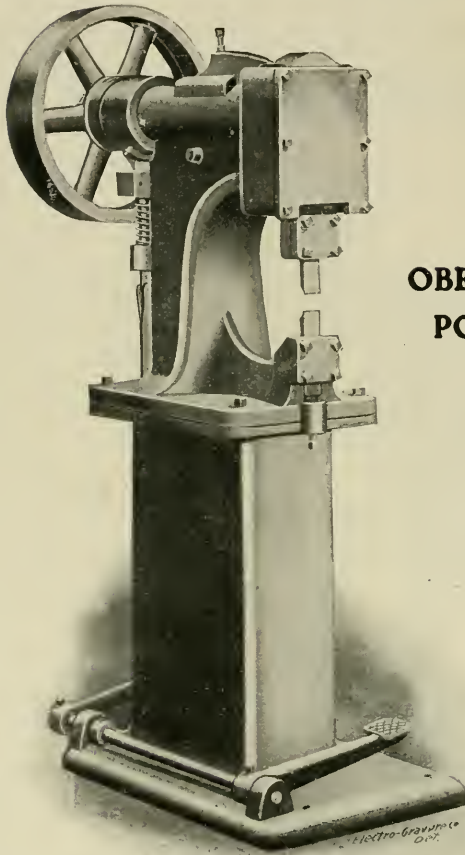
This Machine is designed for use in Brass Foundries to cut sprues or gates from castings and is operated by foot power. It is heavy, has large wearing surfaces, and is guaranteed in every particular. For general work, this machine cannot be excelled for the price. The investment will justify any Foundryman as it takes but a very short time to cut a large quantity compared to the old manner of using the chisel, etc.

This machine will cut a piece equivalent to $\frac{1}{2}$ in. square common yellow brass. Cutters are made of best tool steel $1 \times \frac{1}{2}$ in. and ground to the proper taper for cutting and carefully tempered.

FIG. 236

Depth of throat from cutting edge	10 $\frac{1}{2}$ in.
Space up and down back of cutter	12 "
Height over all	5 ft
Shipping weight	550 lbs.

Price, \$125.00



OBERMAYER'S POWER SPRUE CUTTER

FIG. 235

This machine is designed to cut sprues or gates from castings. It is very heavy, has large wearing surfaces; cutters will remain in line and make clean, close cuts. It is fitted with a very simple clutch, the wearing parts of which are made of tool steel. The machine will cut a piece equivalent to $\frac{3}{4}$ -in. square common yellow brass and is guaranteed in every particular.

Speed, 125 to 150 revolutions per minute.
Pulley, 18-in. diameter, $\frac{1}{4}$ -inch face.

In case it is necessary to cut a larger piece than above, we can supply 24-in. pulley. This will then cut a piece equivalent to 1-in. square common yellow brass. Cutters are made of best tool steel, $1\frac{1}{2} \times \frac{5}{8}$ in.

The dimensions are as follows:

Depth of throat from cutting edge	10 in.
Space up and down back of cutters	$12\frac{1}{2}$ in.
Height over all	5 ft. 3 in.
Shipping weight	1,000 lbs.

Price, \$150.00

Carried in stock ready for immediate delivery.

OBERMAYER'S SAND DRYER

For Drying Sand in Brass Foundries, R. R. Shops and Factories

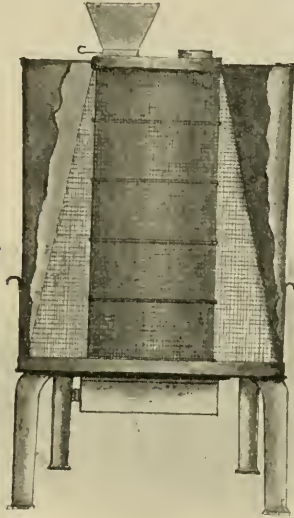


FIG. 237

Consists of a substantial cast iron stove made up of from five to six rings of uniform shape and diameter, with the door opening and hopper at the top for feeding the fuel. The stove is surrounded by a cone of wire cloth or perforated steel, this cone being surrounded by an outer casing of steel, leaving ample space between, for the reception of wet sand. At the bottom of the stove is a perforated base plate. The perforated cone provides a large heating surface, and the wet sand which is fed at the top is rapidly deprived of its moisture, and as it dries falls through the perforated cone and base to the floor or bins beneath. Suitable openings are left in the outer shell for the purpose of cleaning out any gravel or material which has not passed through the perforations. It will be seen that the arrangement of the perforated cone prevents the sand coming in direct contact with the heated stove, adding greatly to its durability. This Dryer has large capacity, and requires little attention, further than to keep it supplied with wet sand and fuel. This Sand Dryer has been in use for a number of years on some of the leading railroads, street railways, foundries and manufacturing plants, giving general satisfaction.

Price, \$140.00

Steam driers with coils can be furnished when desired.

OBERMAYER'S CINDER AND ORE CRUSHER

For Grinding and Washing Brass Skimmings and Ashes

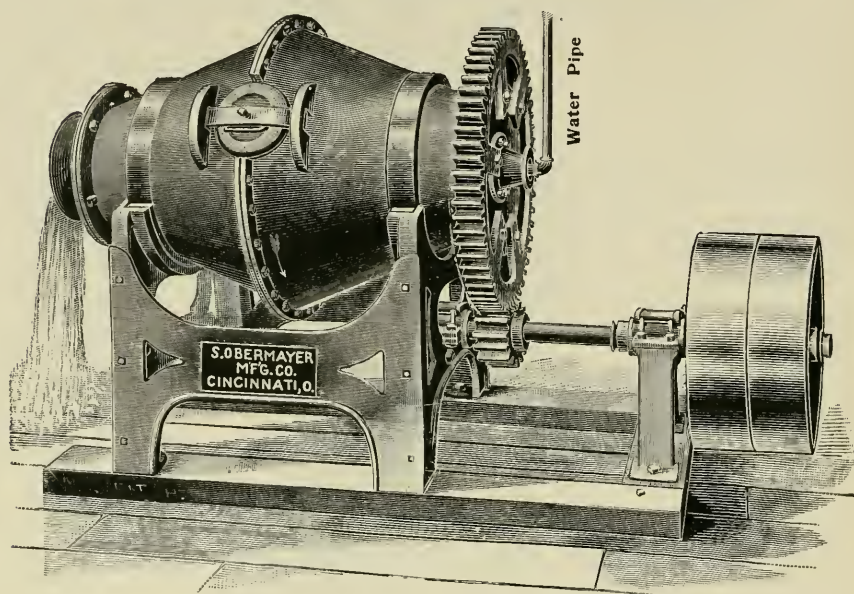


FIG. 238

Made in Two Sizes

This Machine can be operated by a **dry** or **wet process**. When operated by the **dry process**, connections can be made with an Exhaust Fan from which the dust can be withdrawn through the pipe and deposited into a box or receptacle placed in a position to suit the conditions of the plant.

When desired to operate with the **wet process** a $\frac{3}{4}$ -inch pipe supplying the water and a valve controlling the supply is attached to the machine when in operation.

The roller shown in front, revolving in the direction indicated by the arrow, illustrates the principle of the machine, the pockets scooping up the material to be ground and carrying it around and dropping it underneath, to be pulverized over and over again.

The above Machine occupies a floor space of 7 x 3 feet and is 4 feet long and 3 feet in diameter. The roller weighs 675 pounds and is made of White, Hard Cast Iron, being 2 feet long and 18 inches at the greatest diameter. The bearings are made of Nickel Alloy.

The Tumbler, or Barrel, is 4 feet long and 3 feet wide. The case should revolve from 40 to 60 revolutions per minute, and the pinion from 180 to 260 revolutions per minute. Shipping weight of entire Machine is 3,450 pounds; boxed for export 4,400.

This machine will grind and extract metal from 10 to 20 barrels of Brass Foundry Skimmings and Ashes per day.

Full description for setting up and operating will be furnished after order is placed, and special catalogue with prices giving description and dimensions upon application.

List Price, \$400.00

We make one other smaller Standard size.

It's the Best Machine for the Purpose and has the Largest Capacity

OBERMAYER'S PEERLESS ROSIN GRINDER

For Powdering and Pulverizing Rosin

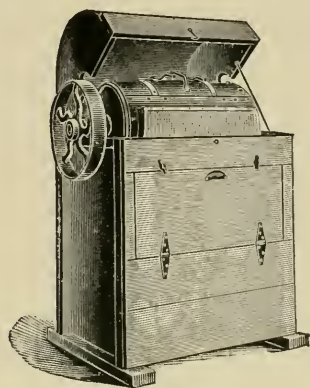


FIG. 239

The rosin is placed in the mill at the top as shown in the above illustration in quantities of a nail keg full at a time. After the material becomes fine enough, it is deposited into a bin below the revolving barrel, from which it may be taken as desired. There is no waste or dust liable to fly about the room, thus avoiding gumming up everything with which it would otherwise come in contact.

It is used in many Malleable Iron and Brass Foundries and is giving the best of results. Where you require a large amount of powdered or ground rosin, this machine cannot be excelled.

These machines are made in two sizes :

No. 1, bolts two barrels per day, list price \$75.00

No. 2, bolts three barrels per day, list price \$85.00

Full directions furnished with the machine.

It is the Best Machine on the Market for the Purpose

BABBITT LADLES AND MELTING POTS

For Pouring Solder, Lead, or White Metal, Etc.

Obermayer's Malleable Iron Ladles



FIG. 240

Double Lipped

Diam. of Bowl, 3 in. . .	\$3.00 per doz.	Diam. of Bowl, 5 in. . .	\$ 7.80
" " 4 " . .	4.50	" " 6 " . .	10.00

SEAMLESS STEEL MELTING LADLES



FIG. 241

Extra strong, made of Plate Steel, Bowls and Handles in one solid piece, handles extra long and strong in proportion to size of bowl, and made round with D shaped end unless ordered flat and straight—except the smaller sizes. See description in price list.

Diameter of Bowl.	Thickness of Bowl.	Length of Handle.	Size of Handle.	Price, Each.
2½ inches.	⅛ inches.	17½ inches.	1¼ in. x ⅞ in.	\$ 1 00
3 "	⅛ "	17½ "	1¼ " x ⅞ "	1 15
4 "	⅛ "	19½ "	1¼ " x ⅞ "	1 30
5 "	⅛ "	23 "	1½ round.	1 45
6 "	⅜ "	29 "	1½ "	1 75
7 "	⅜ "	30 "	1½ "	2 05
8 "	⅜ "	33 "	1½ "	2 65
9 "	⅜ "	35 "	1½ "	3 25
10 "	⅜ "	40 "	1½ "	3 85
11 "	⅜ "	40 "	1½ "	4 45
12 "	⅜ "	44 "	1½ "	5 05
14 "	⅜ "	44 "	1½ "	5 65

MELTING POTS

Wrought Iron Bail

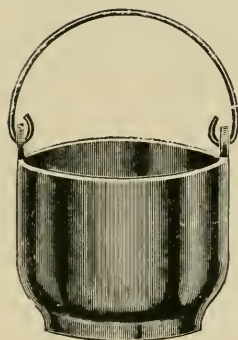


FIG. 242

5	in	\$0.85 each.
6	"	1.20 "
8	"	1.90 "
9	"	2.25 "
10	$\frac{1}{2}$ "	3.00 "
12	"	4.50 "
13	$\frac{1}{2}$ "	6.50 "

Babbitt Ladles—Wrought Iron Bail

5	in., holding 25 lbs.	\$2.50 each.
8	" " 50 "	4.50 "

STEEL PLATES FOR PATTERNS OR FLASKS

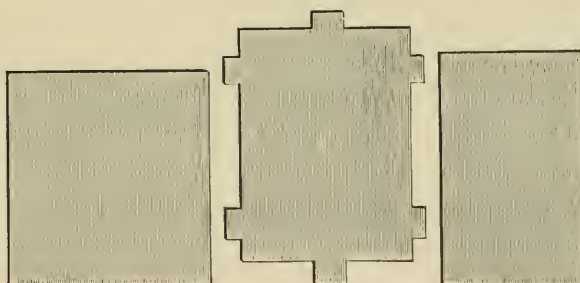


FIG. 243

The illustration shows a Flat Steel Plate, with lugs on the sides and ends, which is used for metal patterns. The metal pattern can be fixed permanently, and held in one place.

We furnish steel plates which are used on the bottom of Flasks, so that there may be no rocking of the flasks. They are stamped and drawn out perfectly true, and are made of sufficient thickness not to permit any sagging of the plate.

We make a specialty of these Plates, and furnish them with or without perforations. Made to order to suit Flasks of any size.

MODERN TOOLS IN A FOUNDRY

It is traditional that all one needs to start a foundry is a few wooden flasks, an old worn-out boiler for a cupola, a horse-power machine or an old played-out engine which somebody threw into the scrap heap. Get a cheap, second-hand blower, a few loads of clay, called molding sand (by some one who knows nothing about it), an old-fashioned wood stove for a core oven, a load of scrap iron and coke, which is bought of the gas manufacturers because it is cheaper than Connellsville, and you have a full-fledged foundry ready for business. If you are not able to make castings and compete with your neighbors who are in the same business, you come to the conclusion you have a poor lot of molders, and that they are not doing enough work.

Now, after many years of experience, the fact still impresses us that **if proprietors of foundries and machine shops would put more time and money in the foundry instead of turning all their attention to the machine shop, the former would be a successful investment.** The machinist will tell you, "I can not fit up that five-ton casting without a suitable planer or boring mill" (which may cost thousands of dollars), and the tools are promptly furnished.

But what are the conditions in the foundry? The pattern maker does his part of the job, and tells the foreman of the foundry how he should make it. The foreman then looks over his flask-yard for something to make it in, and soon finds he has no tools to make such a job. He tells the proprietor he must have a flask made. The answer is, it costs too much; you must fix up something. He picks out the best he has and makes a cheap fixture. The molders consume twice the amount of time on the job trying to make it safe. They cast it, and some weak spot gives out, causing the loss of the casting. The men are dissatisfied, their employer is disappointed, to say nothing of the loss financially. The material and labor are all gone, and when you count the rebreaking of the casting, the handling and getting it through the cupola again, the loss to the proprietor is complete.

There are some well-equipped foundries today, but eight out of ten of them started as stated above. To illustrate: We had a proprietor of a large machine shop and foundry tell us that a foundry was a necessary evil, and he had the poorest equipped foundry we ever saw for turning out the class of work that he was doing. To run a foundry successfully you want an intelligent man to take charge of it, a man that knows his business. There is a certain amount of work the molding machine will do, but it is limited. A first-class molder is a thinking machine, and if he has tools to work with he will be a profit to his employer.

You will naturally say—*what tools are wanted to start a foundry?* You want a quick melting cupola of modern make. You do not hire molders to sit around the shop and wait for iron. A first-class power crane and an oven equipped with cars, making it suitable either for molds or cores, are essentials. The blower is an important factor, for you can not melt fast without a first-class blower. Use good supplies, modern equipment and the best facings and blackings, and secure first-class molders and you will be all right.

Unser Motto :

“Alles was Sie in Ihrer Gießerei nötig haben!”

Correspondenz in allen Sprachen.

Vollständige Ausrüstung von Eisen, Stahl- und Messing
Gießereien.

Telegraphische Adresse „Esso,”

Cincinnati, O., Chicago, Ills., U. S. A.

A B C Code.

Etabliert 1870.

Größtes Exporthaus.



NUESTRA DIVISA :

**“TODOS LOS ARTICULOS PARA VUESTRA
FUNDICION ”**

Correspondencia en todos los idiomas.

Todo lo necesario para equipar las fundiciones de Hierro, Bronce y
Acero.

Dirección cablegráfica “Esso,”

Cincinnati, O., Chicago, Ill., U. S. A.

Código A B C.

Casa fundada en 1870.

Casa que surte al mundo entero.



NOTRE DEVISE :

**“TOUS QUE VOUS AVEZ BESOIN DANS
VOTRE FONDERIE ”**

Correspondence en toutes les langues.

Fournisseurs d'équipement complet de fonderies de fer, d'acier et
de laiton.

Adresse Télégraphique, “Esso.”

Cincinnati, O., Chicago, Ills., U. S. A.

A B C Code.

Maison fondé en 1870.

Grande maison d'exportation.

“Our Motto”

Make the best goods in
the world and sell
them at a profit



“QUALITY”

You will remember the
quality long after the
price has been
forgotten



THE WHITING CUPOLA

2,000 NOW IN USE
IN ALL PARTS OF THE
CIVILIZED WORLD

Heaviest in Construction and
the Best that Skilled
Workmen can
Produce

THE MOST ECONOMICAL AND
FASTEST MELTER
KNOWN

Correspondence Solicited

See following pages for
description and
prices.

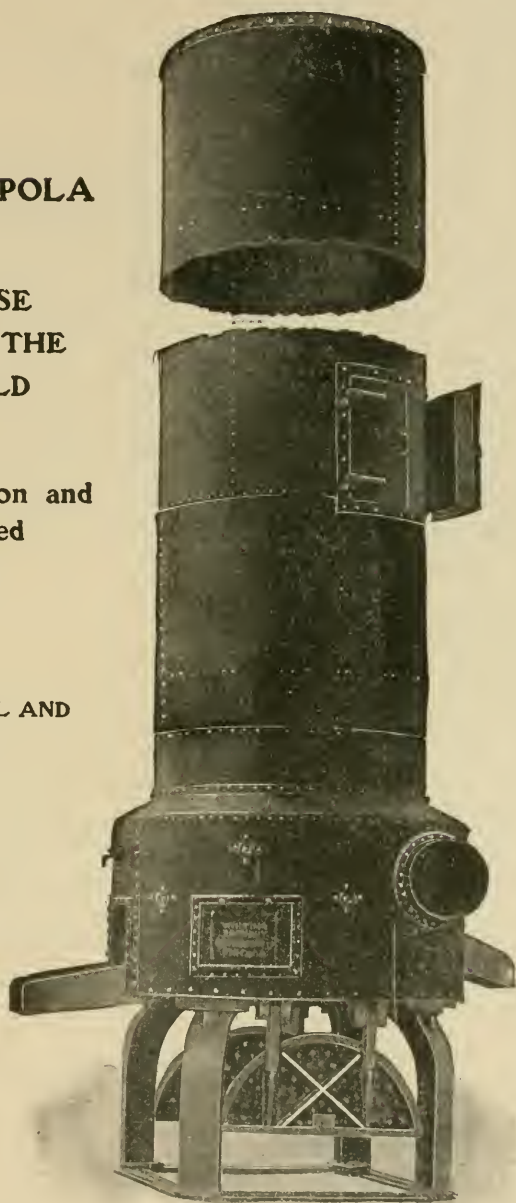


FIG. 244

The Whiting Cupola
(Section E)

THE WHITING CUPOLA

THE Whiting Cupola is the heaviest and best designed cupola manufactured, and the construction is such that they are simply beyond competition with ordinary cupolas offered to foundrymen.

Long experience has unquestionably proven that the Whiting Cupola is the most successful and practical on the market. Economy in the use of fuel is certain. Iron produced is hot, fluid, of uniform grade, and is melted rapidly. Bottom drops clean and damage to lining is reduced to a minimum.

Many testimonial letters have been received from purchasers, which are in themselves a recommendation worthy of consideration. We have noted even more than formerly the desire of those who have had experience with the Whiting Cupolas to again purchase them. Many foundries have installed additional cupolas and others seeing results obtained have replaced other makes with Whiting Cupolas.

Heavy, substantial construction, thorough workmanship, and our readiness to adopt all improvements continue to keep us leaders as cupola makers.

Visitors are cordially invited to our works, and the privilege is extended of full investigation as to the methods pursued in manufacturing our standard product.

We invite your careful perusal of the description of construction and operation in following pages.

Write for special Cupola Catalogue

THE WHITING CUPOLA

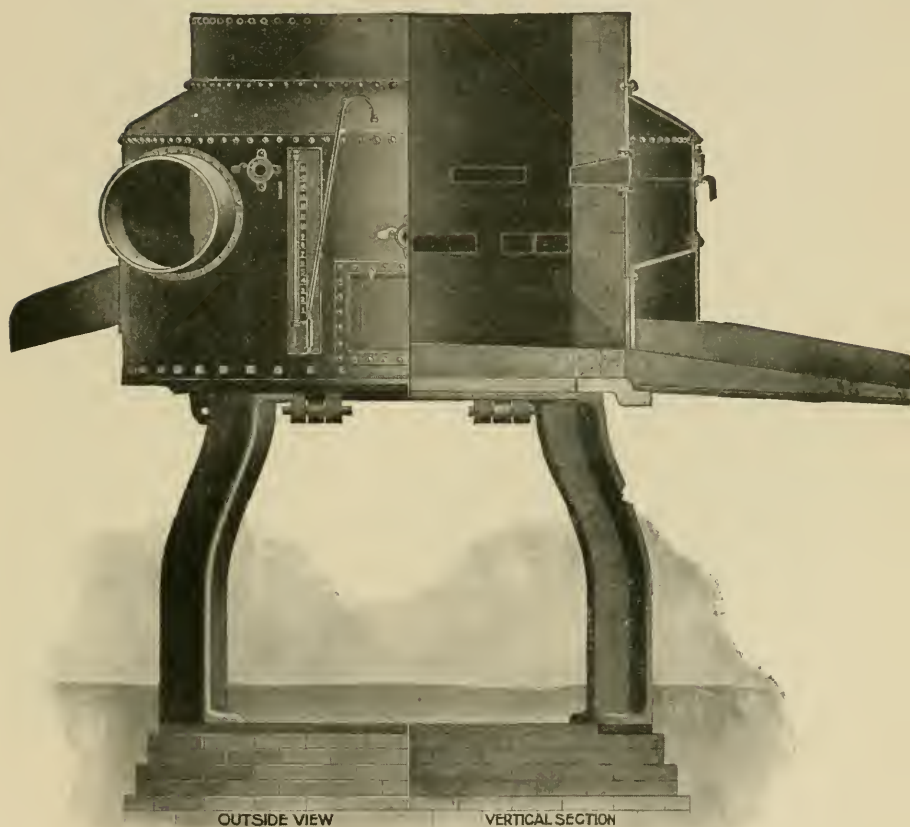


FIG. 245

Elevation of Section (D)

The accompanying illustrations clearly show the internal construction of the body section. The universal satisfaction given by the Whiting Cupola is largely due to the patented arrangement of the tuyere system, which accomplishes the most efficient distribution of the blast yet devised.

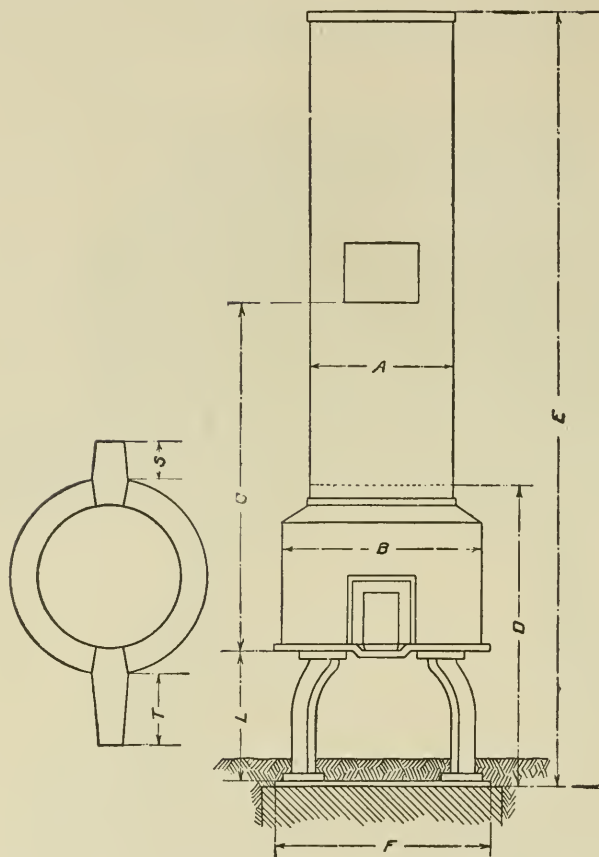


FIG. 246

Sketch of Section E Whiting Cupola

The table on page 186 in connection with diagram herewith gives all general data of the Standard Whiting Cupola. The diameter of the shell is ample to allow for the capacity given. In cupolas larger than the No. 4 we recommend a 9-in. lining, and the capacity is figured on that basis. If a thinner lining is used the capacity will be increased above the figures given and this should be considered in comparing prices.

We name prices on cupola body alone, Section (D), or on the complete cupola with any required length of stack.

We carry in stock sufficient steel plates for all sizes of these cupolas and thus avoid delay of waiting for shipments from the mills.

No. 0 OR TEST CUPOLA

In response to a demand for a small cupola for testing purposes, we have designed the No. 0 cupola, shown herewith. The size of this cupola is given on page 186. The total height of the cupola from floor to top of furnace is 10 feet. Extra stack and hood may be supplied if desired.

This furnace is mounted on trunnions, and the air chamber employed on the standard cupolas is eliminated. It has been in general demand for **technical schools, mining purposes, small foundries** and for **general portable and repair work**. This general design, of this size and several numbers larger, is adapted for mounting in running gear, and thus constructed is most convenient for street work, and has been extensively used for making cast iron rail joints.

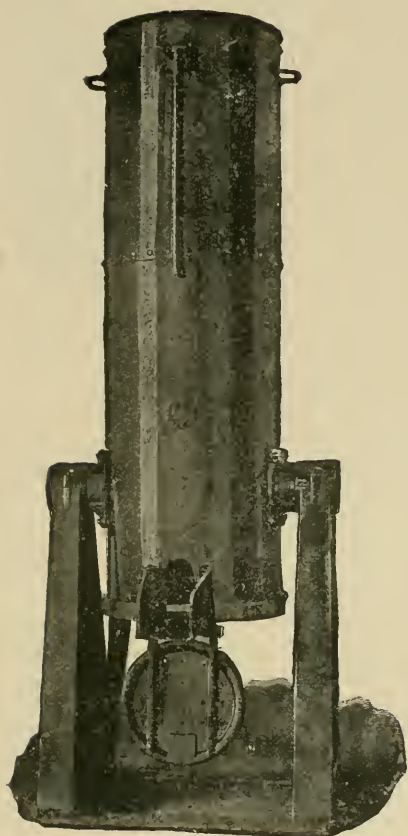


FIG. 247

IMPROVED SPARK ARRESTER



FIG. 248

We manufacture a special double cone spark arrester, as shown in cut. We make a line of these suitable for any size of our cupolas. They effectually obstruct sparks, pieces of hot metal, etc., which may be blown from the cupola toward the close of the heat, and are of great service to foundrymen who are located adjacent to frame buildings or lumber yards, etc.

PATENT TUYERE SYSTEM

These tuyeres are independent of each other; of such a shape that they will readily hold themselves in the lining, and will outlast any other tuyere made. This is the only tuyere that equalizes the distribution of the blast.

There are two rows of tuyeres with relative position as indicated. They are flaring in shape and admit the blast through a small area in the shell, which is expanded into a large horizontal opening inside of the cupola. The air is thus permitted to reach the fuel through an area nearly double that through which it enters the tuyeres, admitting the same volume but softening its force.

The lower tuyeres form an annular air inlet, distributing the blast continuously around the entire circumference of the cupola. They can be placed at varying heights indicated by dotted lines in the sectional elevations. Adjustment is secured by means of patented device furnished only with the Whiting Cupolas. Proper efficiency may be thus maintained even though the method of operation is not as originally designed.

The upper tuyeres are of similar construction to the lower and are intended to supply sufficient air to utilize to the fullest extent any escaping fuel gas. These tuyeres are of great service in quick melting and in large heats. For smaller heats they may be closed by our Improved Independent Tuyere Dampers.

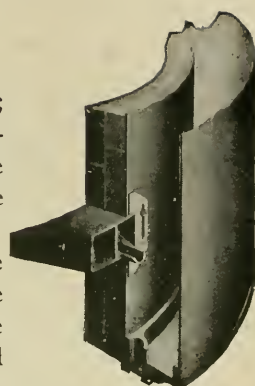


FIG. 249

Section Showing Safety
Tuyere and Lower
Tuyere Adjust-
able Slide.

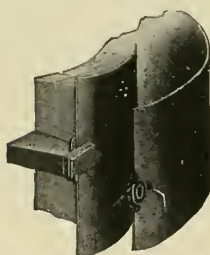


FIG. 250

Section Showing Upper
Tuyere and Tuyere Gate.

Location of Blast Entrance

Letters Refer to Diagrams

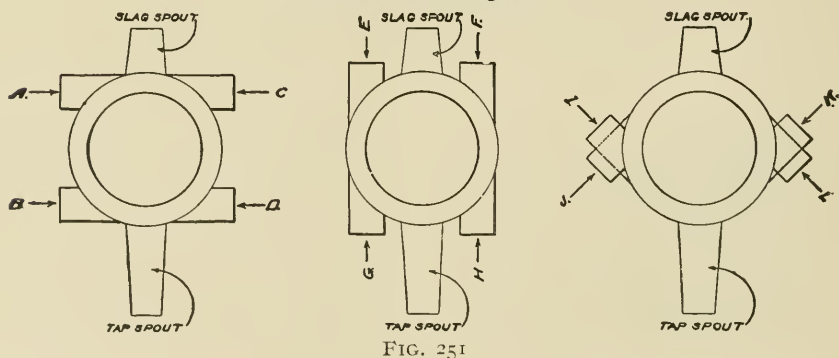


FIG. 251

Repairs and Duplicate Parts of Our Equipment Always Carried in Stock

DETACHABLE ROOF HOOD

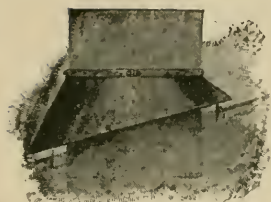


FIG. 252

A conical hood is sometimes desired, surrounding cupolas just above the charging house roof. We make these to fit any of our cupolas, and they are supplied at an extra price. They may be placed around the stack by means of clamps and bolts after the cupola is erected, and may also serve as ventilators for charging house.

BLAST PRESSURE GAUGE

A blast pressure gauge is very serviceable in indicating the air pressure supplied by blowers when applied to cupolas. The gauge shown in this cut registers to 14 oz., while our new design furnished with all cupolas indicates pressures up to 16 oz. Water is used for registering fluid. We send one of these gauges with each of our cupolas, and carry them in stock and sell them independently for use with any cupola.

Blast Pipes and Gates.

We manufacture blast pipe in all diameters from 3 inches to 20 inches; also elbows and connections, and blast gates.

We name prices on this pipe on receipt of information as to length of pipe, elbows, etc.

Operators' Platform

A circular platform made of cast iron, supported by heavy brackets, and supplied with a neat gas pipe railing, is sometimes desired on large cupolas or cupolas with high columns. It is supplied at an additional price.

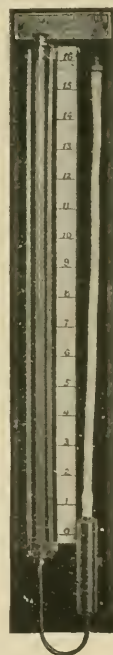


FIG. 253

Tapping Platform With Stairs

For cupolas adapted for car wheel work, we supply, at an extra price, an iron platform with iron stairs. This is of great service, inasmuch as it enables the operator to properly reach the tapping hole at all times, and allows ready access from the floor of the foundry to the operating platform of the cupola.

TABLE OF SIZES AND CAPACITIES FOR WHITING CUPOLAS

Number of Cupola.	Capacity Per Hour.	Diameter of Shell "A."	Diameter of Air Chamber "B."	Diameter Inside Lining.	Lining Used With Capacity Here Rated.		Size of Foundation Plate (Square "F.")	Shortest Allowable Length of Columns "L."	Inside Diameter Blast Pipe Nozzle.	Charging Door Openings.	
					Below Charging Doors.	Above Charging Doors.				No.	Width.
0	1/4 to 1/2	27 in.	44 in.	18 in.	4 1/2 in.	2 1/4 in.	3 ft. 5 in.	2 ft. 0 in.	6 3/8 in.	1	16 x 15 3/4 in.
1	1	32 "	52 "	23 "	4 1/2 "	2 1/4 "	3 " 10 "	2 " 6 "	10 "	1	20 x 20 "
2	2	36 "	57 "	27 "	4 1/2 "	2 1/4 "	4 " 3 "	2 " 6 "	11 3/4 "	1	22 x 22 "
2 1/2	3	4 "	57 "	32 "	4 1/2 "	2 1/4 "	4 " 3 "	2 " 6 "	11 3/4 "	1	22 x 22 "
3	3	46 "	62 "	32 "	7 "	2 1/4 "	4 " 8 "	2 " 6 "	14 "	1	24 x 23 "
3 1/2	5	51 "	68 "	37 "	7 "	2 1/4 "	5 " 0 "	3 " 0 "	14 "	1	27 x 29 "
4	6	56 "	72 "	42 "	7 "	2 1/4 "	5 " 4 "	3 " 0 "	14 "	1	27 x 30 "
5	7	63 "	81 "	45 "	9 "	4 1/2 "	5 " 7 "	3 " 6 "	17 "	1	27 x 30 "
6	9	66 "	87 "	48 "	9 "	4 1/2 "	5 " 10 "	3 " 6 "	17 "	2	27 x 30 "
7	10	72 "	94 "	54 "	9 "	4 1/2 "	6 " 9 "	4 " 0 "	18 1/8 "	2	27 x 35 "
8	12	78 "	102 "	60 "	9 "	4 1/2 "	7 " 1 "	4 " 0 "	18 3/8 "	2	27 x 35 "
9	14	84 "	108 "	66 "	9 "	4 1/2 "	7 " 9 "	4 " 6 "	24 7/8 "	2	27 x 35 "
9 1/2	18	90 "	114 "	72 "	9 "	4 1/2 "	8 " 5 "	4 " 6 "	24 7/8 "	2	27 x 35 "
10	21	96 "	119 "	78 "	9 "	4 1/2 "	8 " 9 "	5 " 0 "	24 7/8 "	2	27 x 35 "
11	24	102 "	128 "	84 "	9 "	4 1/2 "	9 " 1 "	5 " 0 "	24 7/8 "	2	27 x 35 "

Can ship any size Cupola within three weeks if necessary

CUPOLA LININGS

How to Line Your Cupola

IT is a source of great economy to line your Cupola with the very best refractory material that can be secured. Great care and extra caution should be used, so that the blast is not turned direct on the lining, for when this occurs, it will burn out the very best lining in a few moments.

Expansion and contraction are difficulties with which one has to contend in cupola practice. The manner in which the Cupolas are lined and the treatment they receive must be considered.

The shell of the Cupola expands when heated and when in operation the heat causes the lining to expand against the shell. When the Cupola cools contraction occurs. To counteract these conditions we recommend one to two-inch space, which can be filled with dry ground cinders or broken fire brick, forming a grouting; this should be placed between the backing and the shell. If a 4½-inch lining is desired, use our Peerless Blocks up to the charging door, or if a 6-inch lining, use our National or Obermayer Blocks. If a 9-inch lining is required, use a backing of fire brick, stood upright against the grouting, then our NATIONAL or OBERMAYER BLOCKS up to the charging door, or make two circles of 4½-inch each. In the stack or top part of the Cupola, ordinary Circle Fire Brick or a combination of Square and Arch Fire Brick will answer.

Your lining can be well protected by the use of OBERMAYER CUPOLA DAUBING, a special preparation for this purpose. We can furnish Ganister, Mica Schist, Welsh Mountain Clay, Fire Sand and Fire Clay in carloads and less carloads, at lowest market prices.

Correspondence solicited.

SUGGESTIONS FOR LINING CUPOLA

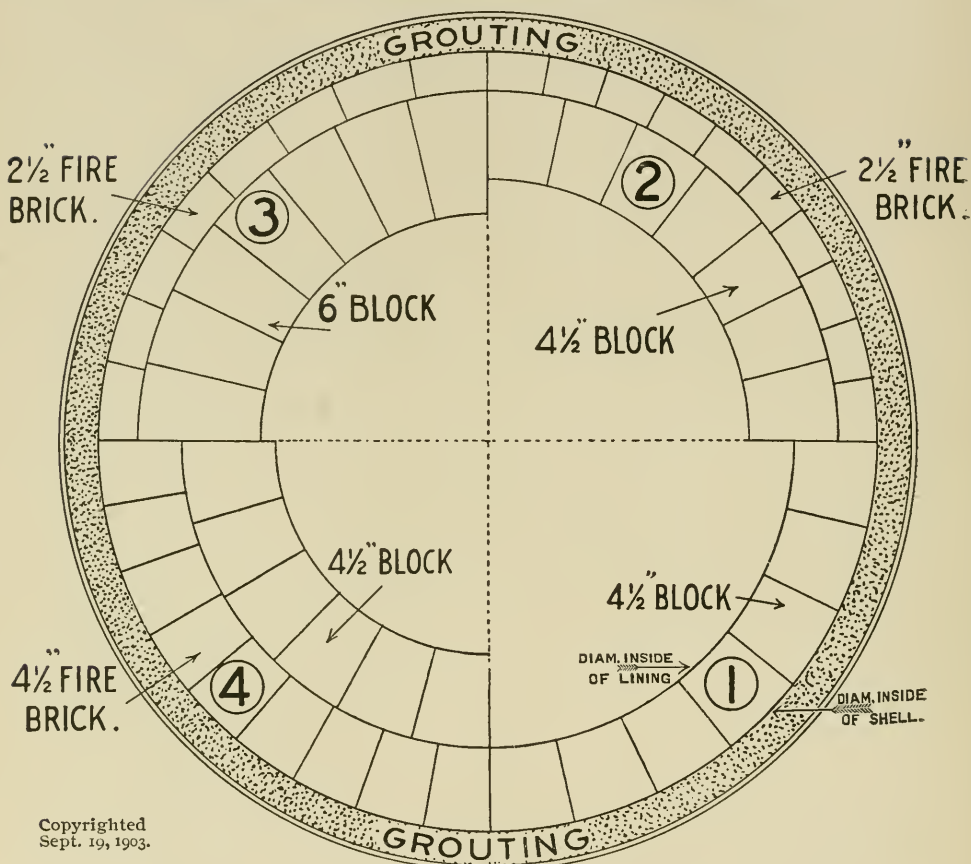


FIG. 254

When sending us your orders for Cupola Lining state diameter of shell of Cupola, diameter of inside of lining and height which you desire. Specify according to number shown in outline above; we will then know your requirements.

Plan No. 1 for $4\frac{1}{2}$ in. lining use Peerless Cupola Blocks $9 \times 9 \times 4\frac{1}{2}$, or Circle Fire Brick $9 \times 4\frac{1}{2} \times 2\frac{1}{2}$.

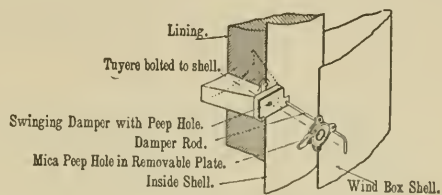
No. 2 for 7 in. lining use Peerless Blocks and Esso Square Fire Brick, or Circle Fire Brick with Esso Fire Brick.

No. 3 for $8\frac{1}{2}$ in. lining use Obermayer's Cupola Blocks $12 \times 6 \times 6$ with Esso Square Fire Brick, or National Cupola Blocks $9 \times 6 \times 4$ with Esso Square Fire Brick.

No. 4 for 9 in. lining use Peerless Blocks with Esso Square Fire Brick stood upright on end.

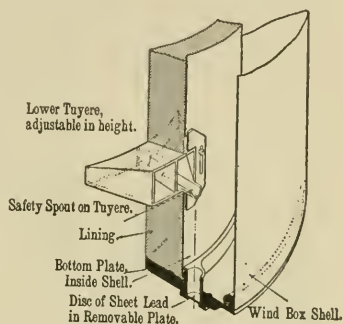
For backing we recommend our Esso Square, Arch, or Split Brick. A combination of the square and split, or Arch Brick, together with our Cupola Blocks can be arranged to make any thickness or diameter of lining desired.

See the following pages for cuts and descriptions.



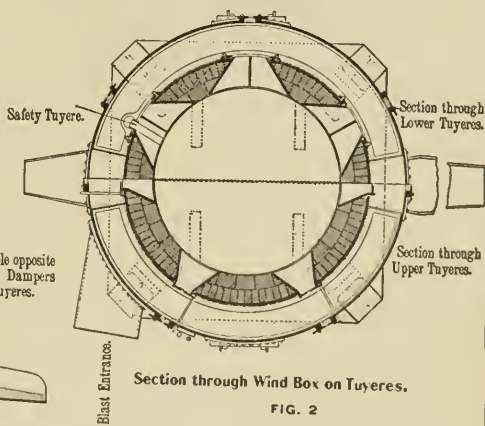
Section on Upper Tuyere

FIG. 4



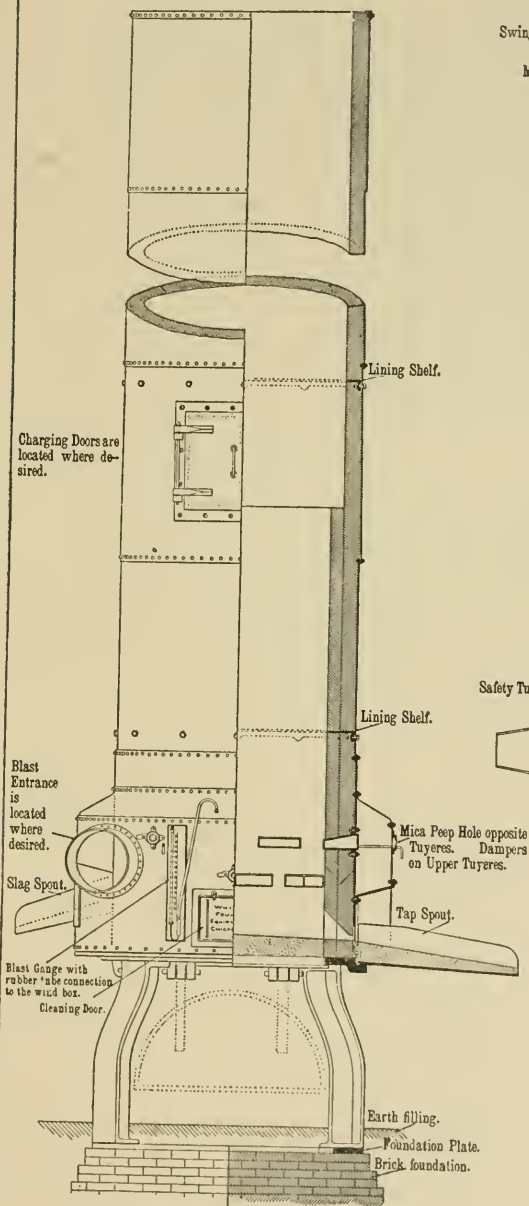
Section on Lower Safety Tuyere

FIG. 3



Section through Wind Box on Tuyeres.

FIG. 2



Section E, Complete Cupola

FIG. 1

Patented in U. S. A.
August 18, 1885.
October 2, 1894.

STANDARD WHITING CUPOLA

CUPOLA LININGS

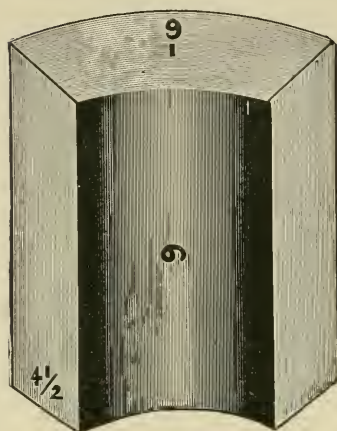


FIG. 255

Peerless Cupola Blocks, 9 x 9 x 4½

This style Cupola Block has been on the market for a great number of years and the following sizes are always kept in stock ready for shipment:

No. A . .	25 in.	outside diameter,	16 in.	inside,	9 to circle		
B . .	30 "	"	"	21 "	"	11 "	"
C . .	36 "	"	"	27 "	"	13 "	"
D . .	39 "	"	"	30 "	"	14 "	"
E . .	49 "	"	"	40 "	"	17 "	"
F . .	60 "	"	"	51 "	"	21 "	"
G . .	69 "	"	"	60 "	"	23 "	"
H . .	84 "	"	"	75 "	"	28 "	"

Any combination may be formed from 16 inches to 75 inches inside lining of Cupola from above sizes when 4½ inches thickness of Block is desired.

Secure prices on carload lots.

Order minimum car filled out with Ground Fire Clay and save money in freight rates.

We guarantee our Cupola Blocks to give entire satisfaction.

CUPOLA LININGS

Our National Blocks, Size 9 x 6 x 4

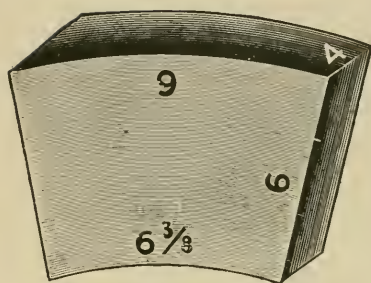


FIG. 256

No. 10. 42 in. outside, 30 in. inside. 15 brick to circle.

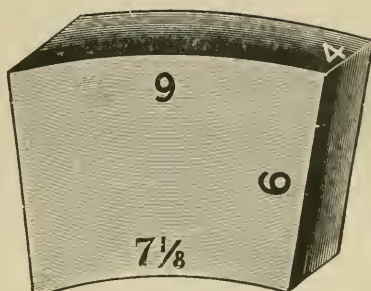


FIG. 257

No. 13. 60 in. outside, 48 in. inside. 21 brick to circle.

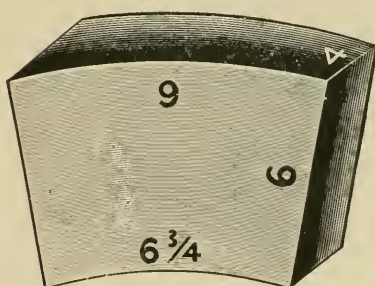


FIG. 258

No. 12. 48 in. outside, 36 in. inside. 17 brick to circle.

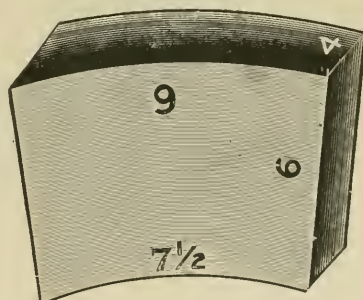


FIG. 259

No. 14. 72 in. outside, 60 in. inside. 25 brick to circle.

Our National Blocks are made from the same mixture as our Obermayer and Peerless. Some people prefer a block only 4 inches high and 9 inches long.

These National Blocks are recommended where the large Blocks are not desired, but where 6-in. thickness of Block is preferred.

Combination of these Blocks can be made for circles 30 inches to 60 inches inside of Lining.

Recommended for use from bottom of Cupola to charging door.

Use our Circle or Square and Arch Fire Brick for stack when relining entire Cupola.

We guarantee our Cupola Blocks to give entire satisfaction.

These Sizes Always In Stock

OBERMAYER CUPOLA LININGS

Obermayer Cupola Blocks, Size 12 x 6 x 6



FIG. 260

Are especially adapted for large Cupolas. Requires less number of joints vertically than any other Block used.

These Blocks In Five Sizes

No. 30 . Obermayer, 42 in. outside, 30 in. inside, 11 to circle.						
" 36 .	"	48	"	36	"	13 "
" 42 .	"	54	"	42	"	14 "
" 48 .	"	60	"	48	"	16 "
" 60 .	"	72	"	60	"	17 "

A combination of these sizes will fit any circle from 30 inches to 60 inches inside of lining where a 6-inch thickness is desired up to charging door.

Any Other Diameter Made To Order In Three Weeks

A FEW WORDS ABOUT FIRE BRICK

WE have made it a study for years to furnish satisfactory brick to the foundry trade, and our business has grown so in this department that we now have a **manager** who looks after the Fire Brick and Fire Clay department exclusively.

We herewith illustrate a few of the many shape Fire Brick that we manufacture, and we carry Cupola Blocks, Circle, Square and all standard sizes in stock at our warehouses in Cincinnati, Chicago, and Pittsburg, also at all our other works.

We have in the past years used and sold Fire Brick from the various Fire Brick districts in the United States, and our long experience has educated us as to what Fire Brick are best adapted for the many purposes for which they are used.

Our "Esso Crown" has a wide reputation among consumers of the highest grade Brick, being homogeneous and very refractory.

Our "National" Fire Brick are made of very much the same material as our Esso Crown, only contains less Calcine and more Plastic Clay, making a Brick that will stand high heats and heavy friction.

Our "Reliance" Fire Brick are our regular second quality grade and are used in places where heats are not so intense.

We call your attention to our Cupola shapes illustrated herewith. We have an extended trade in the United States among the Foundries, particularly among those of the West and Central States. In addition to shapes shown herewith, we make any special radial shapes from drawings.

Please bear in mind there is a great saving by **ordering Fire Brick** in **carload lots**.



Our Brick Guaranteed to Give Best of Satisfaction

CUPOLA LININGS

For those who prefer Brick to Cupola Blocks for Lining, we have

Circle Fire Brick

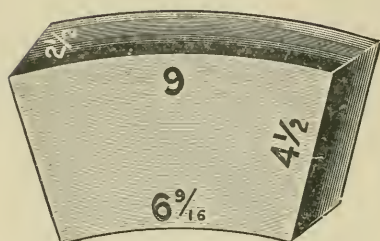


FIG. 261

No. 1 Circle. 33 in. outside,
24 in. inside. 11 brick to circle.

We Carry in Stock the Following
Size Circles

26 in. inside		35 in. outside.
28 "		37 "
30 "		39 "
32 "		41 "
36 "		45 "

Square and Side Arch Fire Brick

Square or 9 Inch Brick

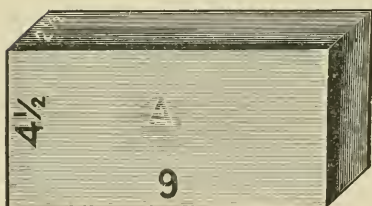


FIG. 262

Esso Crown No. 1 Quality

No. 1 Side Arch Fire Brick

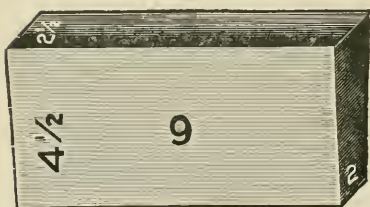


FIG. 264

3 feet inside diameter.
56 to circle.

Square or 9 Inch Brick



FIG. 263

Obermayer Square No. 2 Quality

No. 2 Side Arch Fire Brick

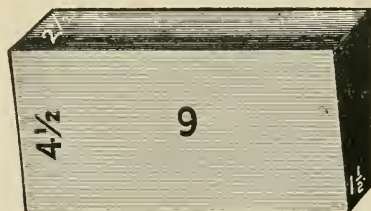


FIG. 265

1 foot 2 in. inside diameter.
28 to circle.

SPLIT, WEDGE AND KEY FIRE BRICK

Split Fire Brick

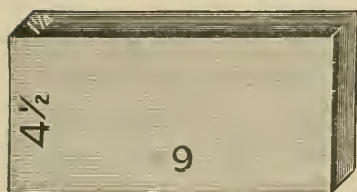


FIG. 266

Split Fire Brick

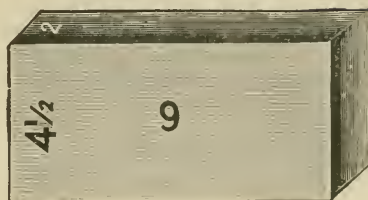


FIG. 267

No. 1 Wedge Fire Brick

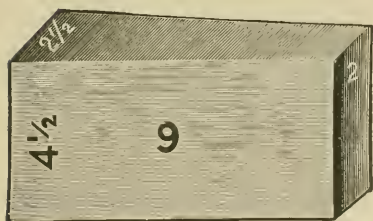


FIG. 268

No. 2 Wedge Fire Brick

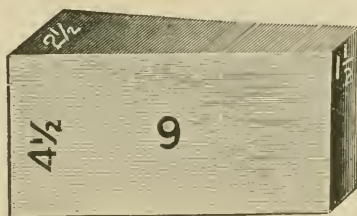


FIG. 269

6 feet inside diameter.

113 bricks to circle. (Bull head).

2 feet 3 inches inside diameter.

56 bricks to circle. (Bull head).

No. 1 Key Fire Brick

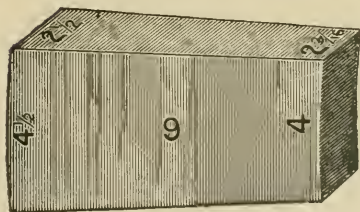


FIG. 270

No. 2 Key Fire Brick

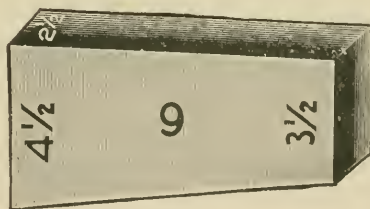


FIG. 271

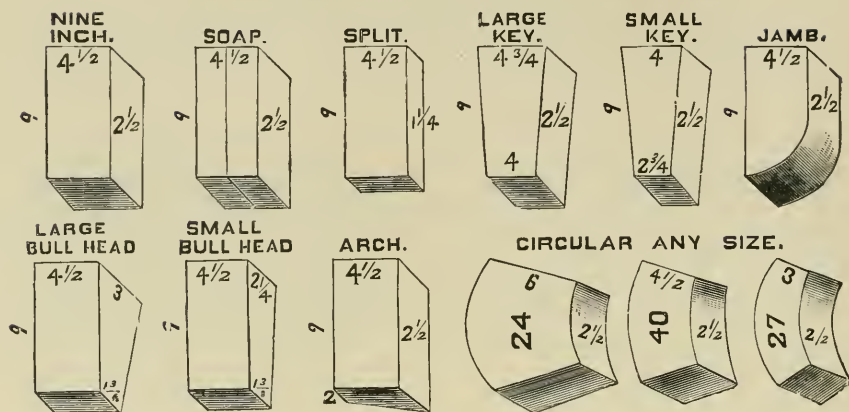
12 feet inside diameter.

113 bricks to circle.

5 feet 3 inches inside diameter.

57 bricks to circle.

AN ASSORTMENT OF SHAPES



Soap Brick

Checker or Regenerator Brick



FIG. 272

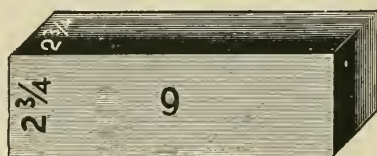


FIG. 273

Sizes of Tile Ordinarily in Stock



FIG. 274

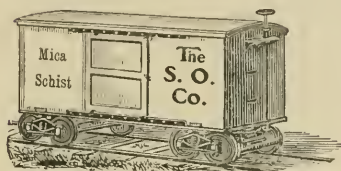
12 x 12 x 2	inches.
12 x 12 x $2\frac{1}{2}$	"
12 x 14 x $2\frac{1}{2}$	"
12 x 15 x 2	"
12 x 16 x $2\frac{1}{2}$	"
12 x 18 x 2	"
12 x 18 x $2\frac{1}{2}$	"
12 x 18 x 4	"
12 x 20 x $2\frac{1}{2}$	"
12 x 22 x $2\frac{1}{2}$	"
12 x 24 x $2\frac{1}{2}$	"
12 x 26 x $2\frac{1}{2}$	"
12 x 30 x 3	"

Other Sizes and Shapes Made to Order

FIRE BRICK FOR BOILERS

We are furnishing to the trade all sizes of **tile** (No. 1 quality), "**Esso Crown**" **Square** and **Arch Fire Brick**, or any other shapes which are required for the setting of boilers. In some cases a No. 2 quality is used for a portion of such work, and if you will send us a list of your requirements we shall be pleased to submit quotations.

MICA SCHIST

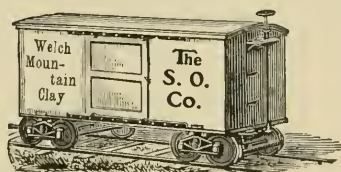


Mica Schist makes a most excellent lining for Cupolas, and will outlast any Fire Brick. Mica Schist is put in as a lining about 2 inches thick after the Cupola has been lined with Fire Brick. Fire Brick when worn out is easily replaced with Mica Schist and is used in the largest Foundries in the United States, especially on large heats of 40 tons and over. It is the most refractory natural material known and is a source of great economy to the foundrymen.

Special price in CARLOADS in bulk.

Sample Barrels, \$2.50 per Barrel

WELCH MOUNTAIN OR SILICACEOUS CLAY



Welch Mountain Clay is a Kaolin product which is mixed with the sand, forming a strong, heavy bond. The largest Steel Foundries about Chester, Pa., Pittsburg, Pa., Cleveland, O., Chicago, Ill., and other sections are large users of this material and it is found to be far superior than so called cheap Fire Clays. On account of its peculiar nature, it gives a bond to the white silica sands, and will withstand any amount of heat without fusing. Used to advantage on poor sand, it helps give it a bond and renewed life for molding purposes.

Shipped in carloads in Bulk only from our own mines at
Welch Mountain.

Prices given on application.

GANISTER

**We are in a Position to Furnish LUMP AND CRUSHED
GANISTER in Carloads or Less**



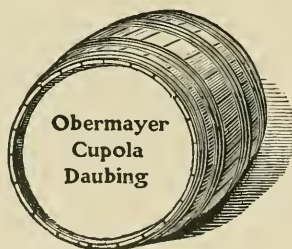
This is an article which is used extensively by the foundries in many places instead of Fire Clay. It analyses very high in Silica and withstands the heat of the iron, thus obviating the trouble of patching up or re-lining, as often as when Fire Clay is used alone. It naturally adds to the life of the lining and is used successfully in steel foundries, steel mills, rolling mills, steel furnaces, also on bottom of furnace beds.

Ground Ganister

Shipped in carloads direct from our mines.

Sample barrels \$3.50 per barrel.

OBERMAYER CUPOLA DAUBING



OBERMAYER CUPOLA DAUBING has been on the market for some time, and, when used judiciously, protects the fire brick lining. It will save labor in cleaning and repairing, and will prevent "bridging" in cupola.

It is manufactured from best quality of Graphite, together with the most refractory materials we can obtain.

It will pay you to give it a trial. Put up in barrels, each containing 500 pounds. Price 3 cents per pound.

Order a barrel and note satisfactory results.

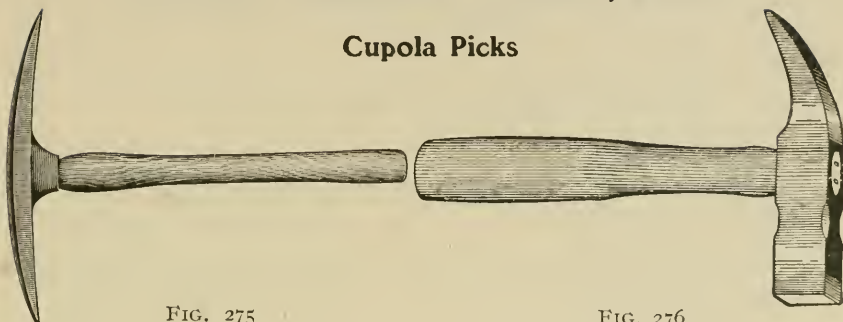
CUPOLA TENDERS' TOOLS, ETC.**Cupola Picks**

FIG. 275

FIG. 276

Weight from 5 to 6 lbs. each.

Cupola picks in two designs always in stock.

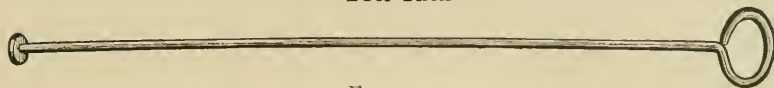
Bott Stick

FIG. 277

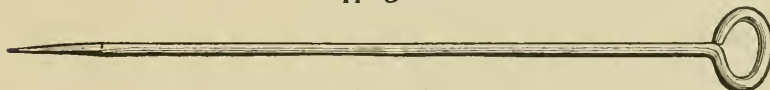
Tapping Bar

FIG. 278

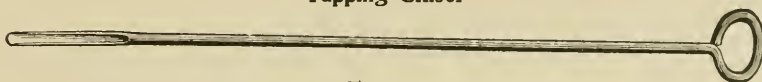
Tapping Chisel

FIG. 279

Other Tools for cupola service supplied when desired.

Write for prices.

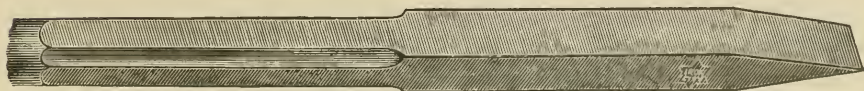
Wedge Point Crowbars

FIG. 280

Weight about 8 lbs. each.

Pinch Point Crowbars

FIG. 281

Weight about 8 lbs. each.

BLOWERS AND FANS

FOR FOUNDRY USE

WE HANDLE ALL THE DIFFERENT LEADING MAKES

By Ordering Through Us We Can Save You Money,
as We Always Give Our Trade the Benefit
of Lowest Jobbers' Prices

When Advised of Your Requirements We Can
Figure Size of Blower Necessary,
also Other Equipments



WE HANDLE ALL KINDS, INCLUDING
EXHAUST FANS USED IN
THE CLEANING ROOM



See the following pages of the different makes with
description and prices.



BUFFALO STEEL PRESSURE BLOWER

Furnished With or Without Countershaft

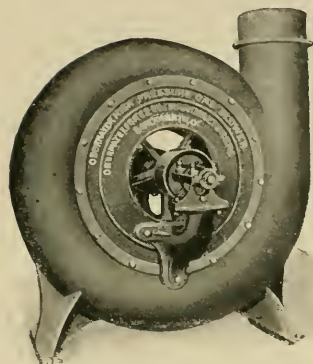


FIG. 282

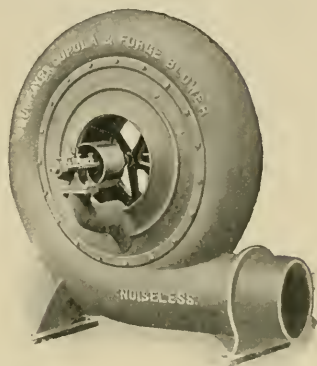


FIG. 283

Numbers one to six have but one pulley. Numbers seven to twelve have two pulleys. All are furnished in the regular discharge, *i. e.*, bottom horizontal, unless otherwise specified in order. Arrangement for other position of discharge may be readily supplied at 10% extra cost.

GUARANTEE.—Buffalo Steel Pressure Blowers are guaranteed to be built of the best material, in a thorough and workmanlike manner, to be of superior design, run with less power, to be more durable and so proportioned as to give stronger blast, and to be sold at lower prices for the same size or capacity than those of any manufacture.

No. of Blower.	Outside Diameter of Outlet.	Height In Inches.	Diameter of Pulley	Face of Pulley.	Price Without Countershaft.	Price With Countershaft.
1	3 ¹ / ₂	12 ¹ / ₂	2 ¹ / ₄	1 ³ / ₄	\$ 12 00	\$ 20 00
2	4	15 ¹ / ₄	2 ³ / ₄	2 ¹ / ₄	18 00	28 00
3	4 ³ / ₄	19 ¹ / ₄	3	2 ⁵ / ₈	26 00	38 00
4	5	23 ¹ / ₂	4	3	36 00	52 00
5	5 ³ / ₈	15 ³ / ₄	4 ¹ / ₄	3	44 00	64 00
6	6 ¹ / ₄	29 ³ / ₄	4 ¹ / ₂	3 ¹ / ₂	55 00	80 00
7	7 ¹ / ₄	33 ¹ / ₄	5	4 ¹ / ₂	70 00	100 00
8	8 ³ / ₄	35	6	4 ¹ / ₂	90 00	130 00
9	10	44	7	5	115 00	170 00
10	12 ¹ / ₄	56	8	5 ³ / ₄	160 00	230 00
11	14 ¹ / ₂	65 ¹ / ₂	8 ¹ / ₂	6 ¹ / ₂	225 00	300 00
11 ¹ / ₂	16 ¹ / ₂	75 ⁵ / ₈	10	7	275 00	350 00
12	18	75 ⁵ / ₈	10	8	325 00	400 00

All Dimensions Are In Inches

THE STURTEVANT STEEL PRESSURE BLOWER

In addition to their use for cupola furnaces and forge fires, they are very efficient machines for producing the blast in sand blast machines.

Great pains have been taken to simplify the construction of these blowers and to strengthen all parts. Any machinist of ordinary skill will readily understand how to adjust, keep in order and repair. They are built heavier and stronger than formerly, particularly in the running parts which are most subject to wear. The fact that these blowers have been run continuously for twenty-five to thirty years, without any repairs whatever, is sufficient evidence of their durability.

Attention is called to the journal boxes, which contain many new and useful improvements over the old ones. Duplicate sets of these journals will be furnished to purchasers desiring them, at a small advance above cost.

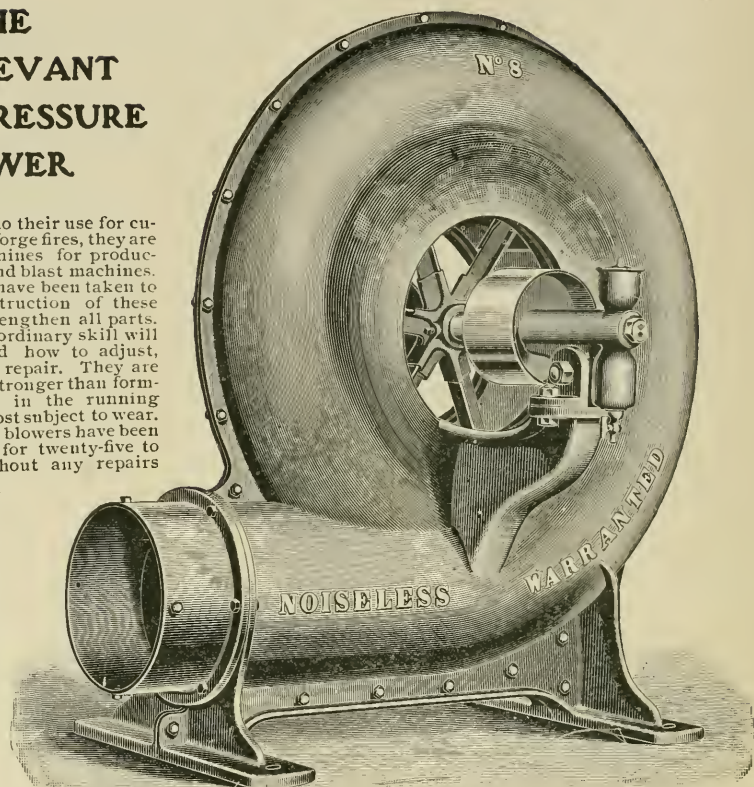


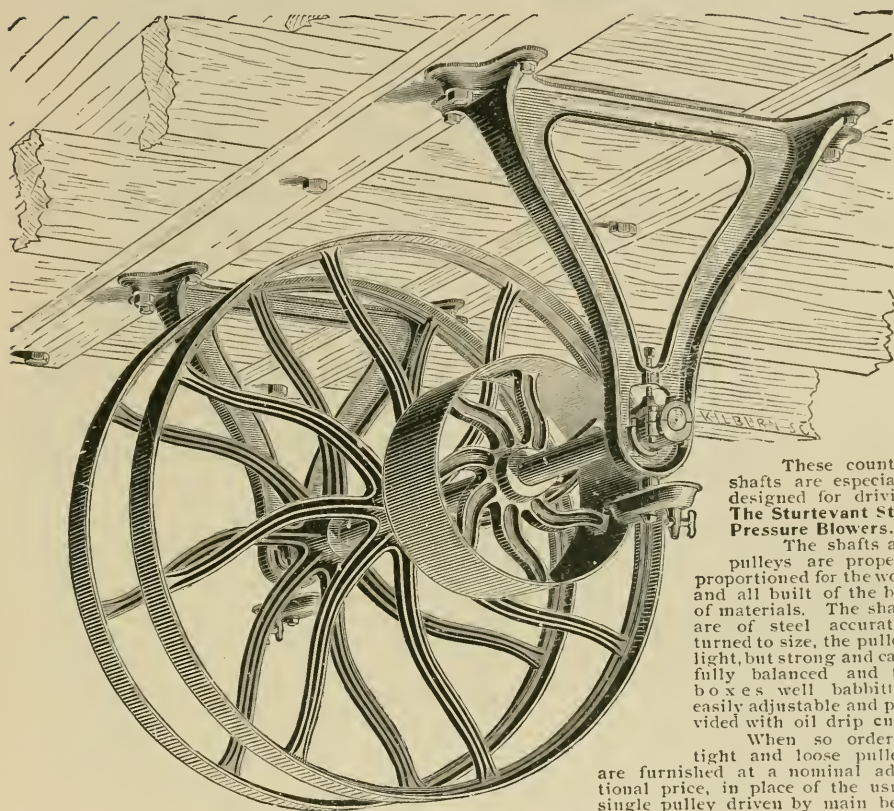
FIG. 284

No. of Blower.	Outside Diameter of Outlet.	Diameter of Pulley.	Face of Pulley.	Number of Pulleys on Blower.	Price.
0000	23 $\frac{3}{4}$	17 $\frac{1}{8}$	13 $\frac{3}{8}$	Nos. 0000 to 3 inclusive have only one pulley.	\$ 15 00
00	3 $\frac{1}{2}$	23 $\frac{3}{8}$	17 $\frac{1}{8}$		20 00
0	4	3	21 $\frac{1}{8}$		26 00
1	4 $\frac{7}{8}$	3 $\frac{1}{2}$	21 $\frac{1}{2}$		36 00
2	5 $\frac{3}{8}$	3 $\frac{3}{8}$	23 $\frac{3}{8}$		44 00
3	6 $\frac{1}{4}$	4 $\frac{1}{2}$	3		55 00
4	7 $\frac{3}{8}$	5	3 $\frac{1}{2}$	Nos. 4 to 10 inclusive have two pulleys.	70 00
5	8 $\frac{7}{8}$	5 $\frac{3}{4}$	4		90 00
6	10 $\frac{1}{4}$	6 $\frac{3}{4}$	4 $\frac{1}{2}$		115 00
7	12	7 $\frac{7}{8}$	5 $\frac{3}{4}$		180 00
8	13 $\frac{3}{8}$	9 $\frac{1}{8}$	6 $\frac{1}{4}$		225 00
9	16	10 $\frac{1}{8}$	8		325 00
10	18 $\frac{1}{2}$	12 $\frac{3}{8}$	9 $\frac{3}{4}$		450 00

When one pulley only is used it is placed on the *right hand*, as one faces the outlet and the blower is designated as *right hand*. When desired, the smaller sizes can be fitted with two pulleys. All sizes are regularly built to discharge horizontally at the bottom, but can be built to order to discharge either horizontally at the top, directly upward or directly downward.

In your correspondence be sure and state for what the blowers are to be used, whether cupola furnaces, forges or other purposes. If for cupolas, state diameter inside of lining number and size of tuyeres, quantity to be melted in given time, kind of fuel used, distance blower sets from cupola, if for forges, how many, kind of work, length of pipes, etc. If possible, send a drawing of arrangement.

THE STURTEVANT COUNTERSHAFTS FOR STEEL PRESSURE BLOWERS



These countershafts are especially designed for driving **The Sturtevant Steel Pressure Blowers.**

The shafts and pulleys are properly proportioned for the work and all built of the best of materials. The shafts are of steel accurately turned to size, the pulleys light, but strong and carefully balanced and the boxes well babbitted, easily adjustable and provided with oil drip cups.

When so ordered, tight and loose pulleys are furnished at a nominal additional price, in place of the usual single pulley driven by main belt.

FIG. 285

No. of Blower.	Diam of Pulley Driving Blower.	Diam. Pulley Driven By Main Belt From Line Shaft.	Diam. of Shaft.	Price With One Driving Pulley.	Price With Two Driving Pulleys.	Number of Pulleys on Blower.
0000 } 00 }	14	5½, 6	¾	\$ 8 00	\$ 10 00	
0	16	6, 7	1	10 00	12 00	Nos. 0000 to 3 inclusive have only one pulley.
1	18	7, 8	1 1/8	12 00	15 00	
2	21	7, 8, 10	1 1/4	16 00	20 00	
3	24	8, 10, 12	1 1/2	22 00	25 00	
4	28	10, 12, 14	1 5/8	30 00	35 00	Nos. 4 to 10 inclusive have two pulleys.
5	32	12, 14, 16	1 3/4	40 00	45 00	
6	36	12, 14, 16, 18	1 7/8	50 00	60 00	
7	42	14, 16, 18, 20	2 1/8	68 00	80 00	
8, 9	48	18, 20, 22, 24	2 1/4	85 00	100 00	
9, 10	54	18, 20, 22, 24	2 1/2	100 00	125 00	

In ordering blowers with countershaft and pulleys the purchaser should always be particular to give *speed of main line of shafting* and the *largest pulley* that can be used thereon, so that pulleys may be sent to suit the circumstances. It is desirable to get as much speed as possible from main line. *Always use as large a pulley as possible on counter shaft for main belt.*

THE STURTEVANT BLAST GATES

These Blast Gates are designed for opening and closing pipes supplying blast to furnaces, forges, etc., for use in exhaust piping systems where shavings, smoke and the like are to be removed, or for regulating the distribution of heated air in connection with **The Sturtevant Hot Blast Steam Heating System.**

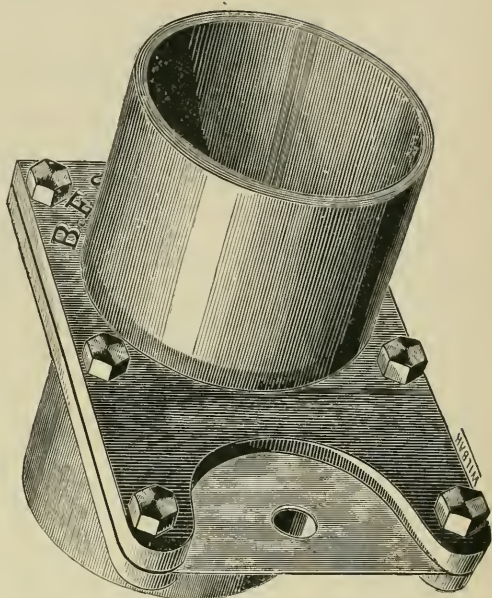


FIG. 286

Slide Pattern.

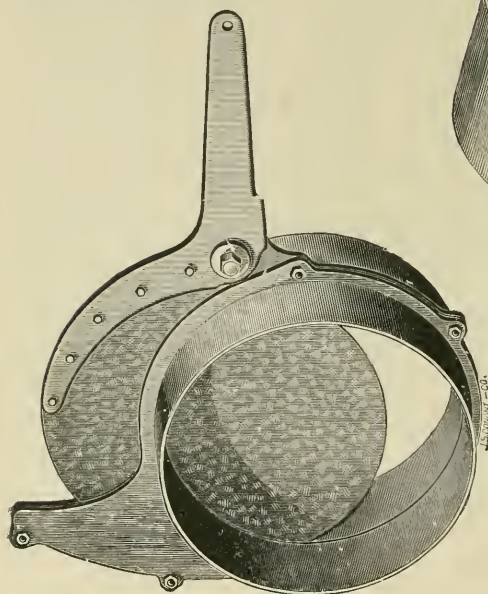


FIG. 287

Lever Pattern

Two styles can be furnished; the lever pattern and the slide pattern. The former can be readily manipulated by cords, and will be found very convenient in cases where it cannot be readily reached by the hand.

Particular attention is called to the fact that the use of blast gates, to close pipes when not in use, insures a great saving in power, as a blower requires far less power to drive it with the connections closed than with them open.

Prices Reduced 20 Percent From Former List

Size.	Material	Price	Size.	Material.	Price.
1½ in.	Composition.	\$ 2 00	8 in.	Iron.	\$ 7 00
2 "	"	2 50	9 "	"	8 00
2½ "	"	3 00	10 "	"	9 00
3 "	"	3 50	12 "	"	12 00
3½ "	"	4 00	14 "	"	16 00
4 "	Iron.	3 00	15 "	"	20 00
4½ "	"	3 50	16 "	"	24 00
5 "	"	4 00	18 "	"	30 00
5½ "	"	4 80	20 "	"	36 00
6 "	"	5 50	24 "	"	40 00
7 "	"	6 20	30 "	"	50 00

Prices are the same for lever pattern and slide pattern.

The size indicates the outside diameter of the collar of the blast gate where the pipe slips on.

ROOTS POSITIVE PRESSURE BLOWER.

With Electric Motor on Bed Plate

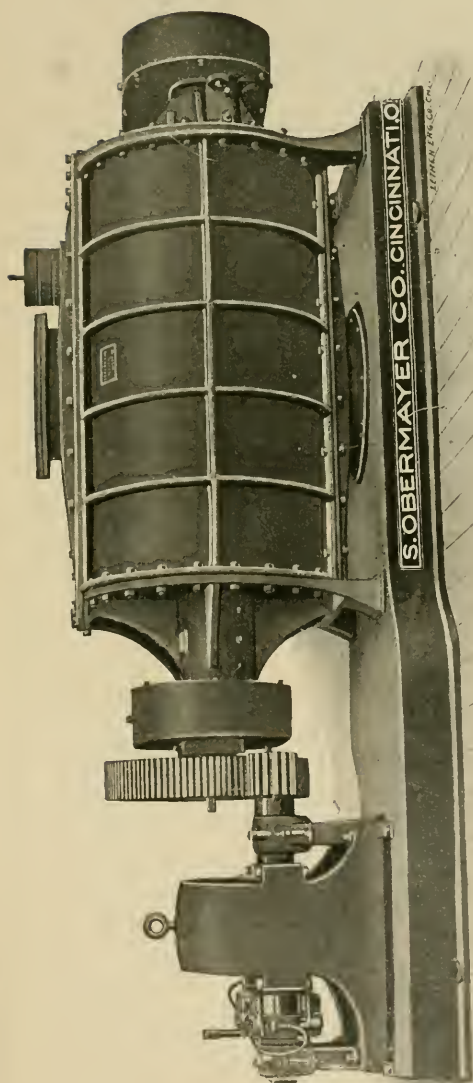


FIG. 288

Speeds and Capacities of Roots Blowers for Cupolas.

No. 2 Blower —Adapted to a cupola 28 to 30 inches inside lining. Discharges 5 cubic feet per revolution.	No. 5 Blower —22 cubic feet per revolution. Adapted to cupola 43 to 54 inches inside lining.	No. 6 Blower —37 cubic feet per revolution. Adapted to cupola 54 to 66 inches inside lining.	No. 6 Blower —16 cubic feet per revolution. Adapted to cupola 66 to 72 inches inside lining.
160 Revs. per minute will melt $1\frac{1}{2}$ tons per hour	160 Revs. per minute will melt 7 tons per hour	150 Revs. per minute will melt 11 tons per hour	120 Revs. per minute will melt 27 tons per hour
275 " " " " " " " "	205 " " " " " " " "	150 Revs. per minute will melt $13\frac{1}{2}$ " " " "	130 " " " " " " " "
275 " " " " " " " "	250 " " " " " " " "	210 " " " " " " " "	150 " " " " " " " "
300 " " " " " " " "			
No. 3 Blower —Adapted to a cupola 30 to 32 inches inside lining. Discharges 5 cubic feet per revolution.	No. 5 Blower —29 cubic feet per revolution. Adapted to cupolas 48 to 60 inches inside lining.	No. 6 Blower —37 cubic feet per revolution. Adapted to cupola 54 to 66 inches inside lining.	No. 7 Blower —83 cubic feet per revolution. Adapted to cupola 74 to 90 inches inside lining.
225 Revs. per minute will melt 3 tons per hour	160 Revs. per minute will melt 9 tons per hour	150 Revs. per minute will melt 11 tons per hour	130 Revs. per minute will melt 25 tons per hour
230 " " " " " " " "	200 " " " " " " " "	150 " " " " " " " "	130 " " " " " " " "
230 " " " " " " " "	225 " " " " " " " "	160 " " " " " " " "	130 " " " " " " " "
275 " " " " " " " "			
No. 4 Blower —13 cu. ft. per revolution. Adapted to cupola 33 to 4 inches inside lining.	No. 5 Blower —29 cubic feet per revolution. Adapted to cupola 43 to 54 inches inside lining.	No. 6 Blower —37 cubic feet per revolution. Adapted to cupola 54 to 66 inches inside lining.	No. 7 Blower —83 cubic feet per revolution. Adapted to cupola 74 to 90 inches inside lining.
175 Revs. per minute will melt 4 tons per hour	160 Revs. per minute will melt 7 tons per hour	150 Revs. per minute will melt 11 tons per hour	130 Revs. per minute will melt 25 tons per hour
220 " " " " " " " "	205 " " " " " " " "	150 " " " " " " " "	130 " " " " " " " "
250 " " " " " " " "	250 " " " " " " " "	210 " " " " " " " "	150 " " " " " " " "
275 " " " " " " " "			
No. 5 Blower —22 cubic feet per revolution. Adapted to cupola 43 to 54 inches inside lining.	No. 6 Blower —37 cubic feet per revolution. Adapted to cupola 54 to 66 inches inside lining.	No. 7 Blower —83 cubic feet per revolution. Adapted to cupola 74 to 90 inches inside lining.	No. 8 Blower —16 cubic feet per revolution. Adapted to cupola 66 to 72 inches inside lining.
160 Revs. per minute will melt 7 tons per hour	160 Revs. per minute will melt 9 tons per hour	150 Revs. per minute will melt 11 tons per hour	120 Revs. per minute will melt 27 tons per hour
205 " " " " " " " "	200 " " " " " " " "	150 " " " " " " " "	130 " " " " " " " "
250 " " " " " " " "	225 " " " " " " " "	160 " " " " " " " "	150 " " " " " " " "

THE CONNERSVILLE ROTARY POSITIVE PRESSURE FOUNDRY BLOWERS

Belt, Engine or Motor Driven

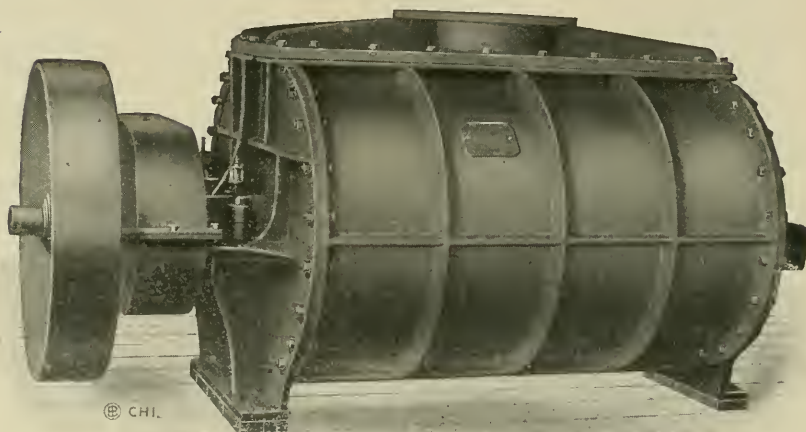


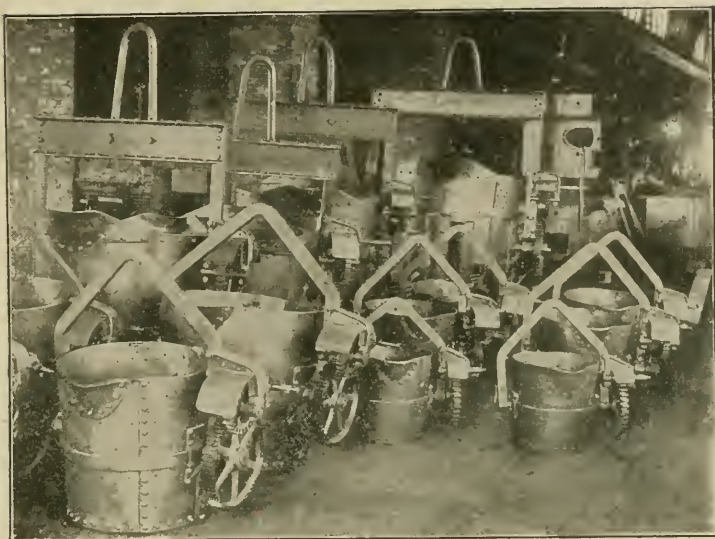
FIG. 289

Displacement.	Speed and Melting Capacity.					Suitable for Cupola in Inches After Lining.
12 $\frac{3}{4}$ cu. ft.	150 to 260 R. P. M.	will melt from	4 to	6 $\frac{1}{2}$ tons per hr.		32 to 34
17 "	145 "	250 "	" "	5 "	8 $\frac{1}{2}$ "	36 " 45
24 "	150 "	225 "	" "	8 "	12 "	42 " 54
33 "	150 "	210 "	" "	10 "	14 "	48 " 60
45 "	135 "	200 "	" "	12 "	18 "	54 " 66
57 "	130 "	185 "	" "	15 "	21 "	60 " 72
68 "	130 "	180 "	" "	18 "	24 "	66 " 84
86 "	120 "	160 "	" "	21 "	27 "	72 " 90
103 "	120 "	150 "	" "	24 "	30 "	84 " 96
120 "	112 "	135 "	" "	27 "	33 "	{ Suitable for } Two Cupolas { 60 to 66

The above calculations are based on 30,000 cubic feet of air per ton of iron melted. In practice it has been found that with the larger sizes the melting is 10 to 15 percent more than this when the conditions are right.

General catalogue sent on application.

FOUNDRY LADLES



**From 50 Lbs. to 10,000 Lbs. Capacities Carried in Stock
Ready For Immediate Shipment**

Larger Sizes Built to Order.

Our Foundry Ladles are the best on the market. They are made from heavy plate (corresponding to the size) by skilled and careful workmen.

**Each and Every Ladle Thoroughly Tested Before It
Leaves Our Establishment.**

Our Ladles are guaranteed to hold the full rated capacities.

More of our Ladles in daily use throughout the United States and Canada than all others combined.

See following pages for cuts, description and prices.

HAND LADLE BOWLS AND SHANKS



FIG. 291

**Solid Shank Always
Sent Unless Other-
wise Specified**



A



B



C

FIG. 290

- A Cast Ladle Bowl.
- B Pressed Steel Ladle Bowl.
- C Wrought Ladle Bowl.

Our Hand Ladles are made suitable for convenience of molders, light and durable. Gas Pipe Shanks supplied when ordered.



FIG. 292

**Gas Pipe Shank at
Extra Cost**

Hand Ladles With Shanks

Light and durable. Wrought Bowls made of steel plate, with two drawn lips.

Capacity inside of lining, 30, 50 and 60 pounds.

Prices Are Made on Bowls With and Without Shanks

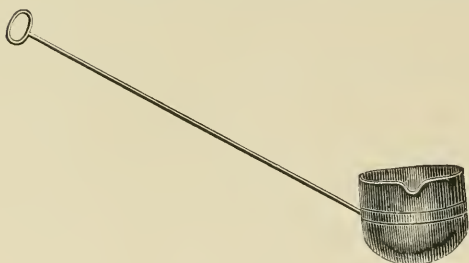


FIG. 293

Stamped Steel Ladle Bowl and Shank

Top diam. $8\frac{3}{4}$ in., bottom diam. 5 in.,
depth, $6\frac{7}{8}$ in.

Specify when ordering Ladles whether Cast, Pressed Steel or Wrought Bowls are desired.



FIG. 294

**Wrought Steel Ladle
Bowl and Shank**

For dimensions see
page 216.

In Stock Ready for Delivery in Any Quantity

HAND BULL LADLES

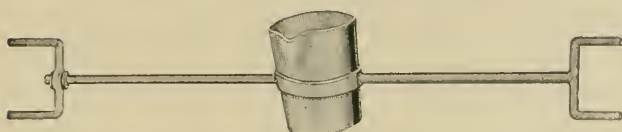


FIG. 295

Ladle Showing Swivel Shank

Stock sizes with swiveled shanks in 150 and 200-lb. capacities.



FIG. 296

Ladle Showing Single End Shank

Capacity Inside of Lining.	Capacity Inside of Lining.
100 lbs.	800 lbs.
150 "	1,000 "
200 "	1,200 "
250 "	1,500 "
300 "	2,000 "
400 "	2,500 "
500 "	3,000 "
600 "	

Capacities Hand Bull Ladles

Bowls made of steel plate, with two drawn out lips.

Shanks of ladles 200 lbs. and 250 lbs. **have double handles on each end.**

One handle swiveled at additional price when so ordered.

Prices are made on bowls with and without shanks.

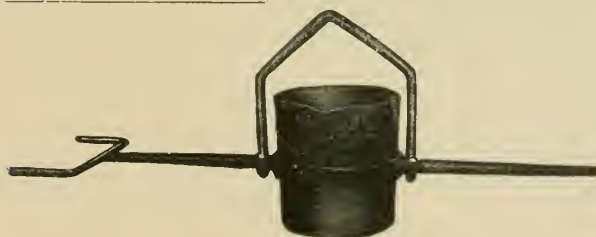


FIG. 297

Capacities Shank Crane Ladles

CRANE LADLE
WITH SHANK
AND BAIL

Capacity Inside of Lining.	Capacity Inside of Lining.
150 lbs.	800 lbs.
200 "	1,000 "
250 "	1,200 "
300 "	1,500 "
400 "	2,000 "
500 "	2,500 "
600 "	3,000 "

Bowls made of extra heavy plate, with two drawn out lips. Forged shank and bail.

One handle swiveled at additional price when so ordered.

Prices are made on bowls only, and bowls with shanks and bails, or with shanks only.

We carry in stock and furnish to the trade large ladle bowls which are used as set ladles in front of Cupolas. Write for prices

CRANE LADLES

Notes on Construction

Bowl is constructed of heavy plates and is of liberal size for the rated capacity. General dimensions and allowance for lining and top space are given in table on page 216. In making comparison of prices it should be remembered smaller sizes can be furnished cheaper. Shell plates, tank steel. Bottom, best flange steel.

Two drawn out lips are standard. Detachable riveted lips if desired. Vent holes in bottom. Rivets are driven by single stroke power machine, heads flattened inside.



FIG. 298

Crane Ladle With Improved Pin Spur Gear

Belt is welded and a drive fit on the shell, strengthening bowl in most substantial manner.

Bail, "V" shape, forged, of rectangular section, strongest for weight, for ladles under ten tons capacity.

"Square" bail, structural steel head beam with large forged loop for hook, for capacity ten tons and over. The "V" bail, with strut, may be used in place of latter if crane lift is sufficient. It is supplied at reduced price.

Trunnions are of patented design. They are cast steel with large base plates accurately fitting the shell. Plates are made with continuous rebate for belt and pockets for bottom band. Journals are turned.

All Ladle orders up to ten ton capacity shipped the day we receive the order.

Bottom Band is riveted through trunnion plate and shell on both sides.

Braces attached to bottom band and *supporting trunnion* outside of the bail are furnished on all sizes three tons and over. This design permits ladle to be more completely overturned than others.

Steadying Shanks, two for ladles *three tons* and over and one each for smaller sizes, are furnished.

Gearing. Our improved pin spur gear, shown in cut, is the ideal gearing for tipping a crane ladle. It is rapid and easy to operate. Back gearing and pinion for trunnion gear are mounted in self contained bracket which is rigidly attached to upright member of bail. A steel cover effectually protects the gearing from splashing of molten metal, but does not prevent quick inspection at all times as do enclosed forms. The toothed pinion forms a lock for the gearing when in proper position; a draw pin is furnished which provides absolute security against accidental overturning. The hand wheel shaft is extended sufficiently to allow operator to fully oversee the pouring. Double gearing on all ladles *two tons* capacity and over.

Ladles with this gearing are most in demand of any ladles on the market.

Worm gearing is illustrated in accompanying cut. It is compact in design and fitted with bevel gearing to allow extension of hand wheel shaft at right angles. Worm and bevels are mounted in heavy bracket which is rigidly attached to upright member of bail.

Ladles up to ten ton capacity in stock ready for immediate shipment.

Specify whether Spur Gear or Worm Gear is wanted; we have both.



FIG. 299

Crane Ladle With Worm Gear

NOTES

Standard Patterns For All Capacities

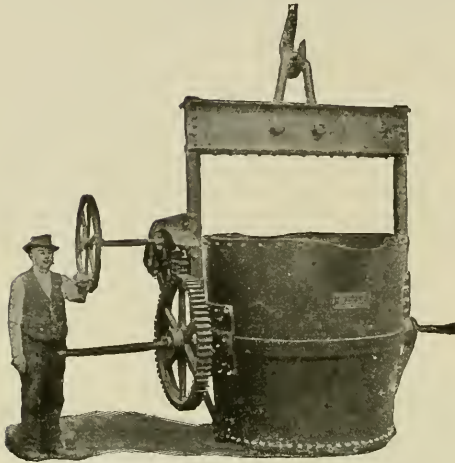


FIG. 300

Crane Ladle With "Square Bail"

Standard Construction For Ten Tons and Over

The (V) bail with strut is recommended where head room is sufficient. The design is simple and the ladle may be hooked with the greatest ease.

All standard ladles, capacity *eight* tons or over, are designed for brick lining, and angle bar is riveted around top of shell.

These ladles are balanced so that they will be level when full or nearly full of metal; when empty they hang a little out of plumb.

Vent holes are provided in the bottoms of all crane ladles.

For Crane Ladles of medium capacity the pointed (V) bail is preferred. It is very rigid when properly constructed and crane hook is guided at once to the middle.

The square bail is furnished only for capacities *ten* tons and over. The structural steel head beam is a perfectly reliable construction. Head room is reduced to a minimum.

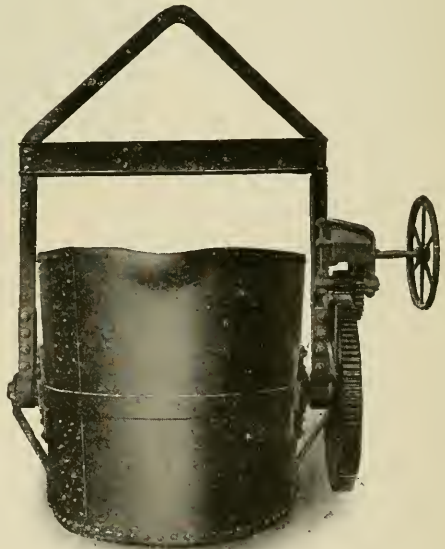


FIG. 301

Crane Ladle With "V" Bail and Strut

Each and every Ladle tested before same leaves our factory

TRUCK LADLES

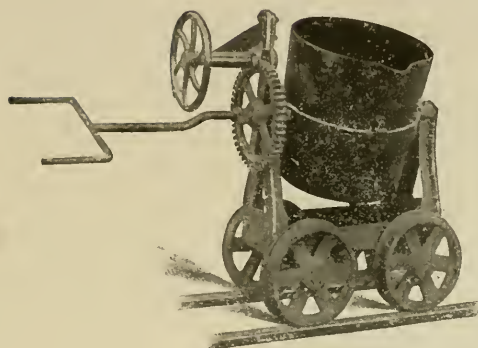


FIG. 302

Gearing and bearings are protected from splashing over of molten metal.

In writing for prices give capacity required and gauge of track; also say if desired to tip with shank, or with gearing as shown in cut, mentioning whether pin spur gear or worm gear is required.

Truck Ladle Standard Construction, For Capacities Under 3,000 Pounds

Capacity Inside of Lining.	Height of Ladle Above Track.	Standard Gauge of Truck Wheels.	Capacity Inside of Lining.	Height of Ladle Above Track.	Standard Gauge of Truck Wheels.
800 lbs.	3 ft. 1 in.	18 in.	1500 lbs.	3 ft. 3 in.	18 to 24 in.
1000 "	3 " 2 "	18 "	2000 "	3 " 8 "	18 to 24 "
1200 "	3 " 2 "	18 "	2500 "	3 " 9 "	18 to 24 "

NOTE—The above heights are figured on the basis of using 16 inch wheels. If 12 inch wheels are preferred the height will be reduced two inches.

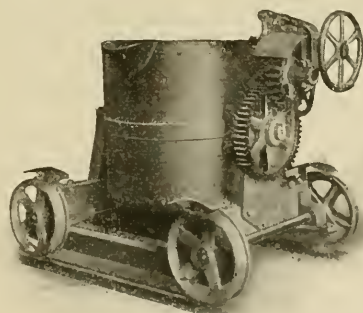


FIG. 303

Truck Ladle Standard Construction for from 3,000 to 6,000 Pounds

Capacity Inside of Lining.	Height of Ladle Above Track.	Usual Gauge of Truck Wheels.	Capacity Inside of Lining.	Height of Ladle Above Track.	Usual Gauge of Truck Wheels.
3000 lbs.	3 ft. 7 in.	18 to 24 in.	5000 lbs.	3 ft. 10 in.	21 to 30 in.
4000 "	3 " 8 "	21 to 30 "	6000 "	3 " 11 "	21 to 30 "

Special Swivel End Shanks in Stock for Bull Ladles

GEARED CRANE TRUCK LADLES

This design may be used for either a crane ladle or a truck ladle. Ladle is furnished with bail, and the construction of standards on truck is such that ladle is easily removed when desired for use as a crane ladle.

Any change from standard gauge is subject to an increase in price.

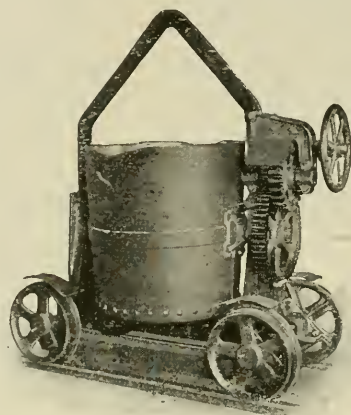


FIG. 304

Capacity of Ladle Inside of Lining.	Standard Gauge.	Capacity of Ladle Inside of Lining.	Standard Gauge
1500 pounds	18 to 24 inches.	4000 pounds	21 to 30 inches
2000 "	18 to 24 "	5000 "	21 to 30 "
2500 "	18 to 24 "	6000 "	21 to 30 "
3000 "	18 to 24 "		

TRUCK LADLES

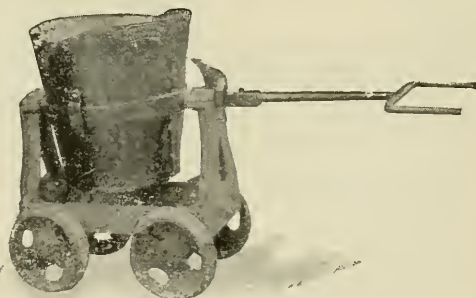


FIG. 305

These ladles are unexcelled for distributing molten iron in a foundry. They have cast iron frames and standards, steel axles, chilled wheels and roller bearings. Standard gauges are given in upper table, page 213, but they are made to suit any desired gauge, subject to an increase of price.

Special Ladles of any description made to order on short notice.

Special Ladle Catalogue sent on application.

RESERVOIR LADLES

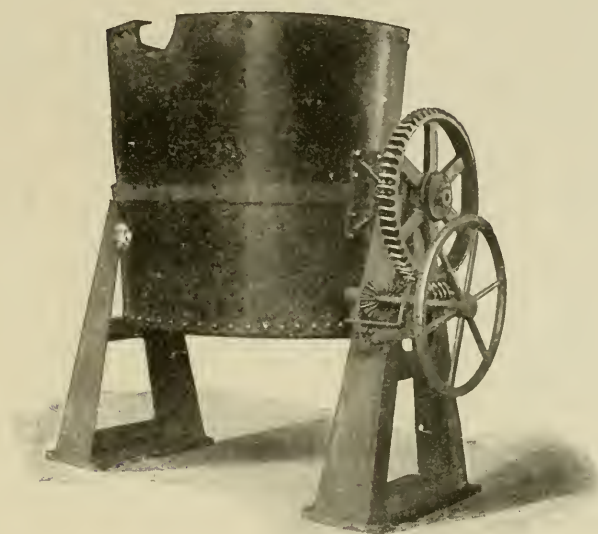


Fig. 306

Reservoir Ladle With Hand Tipping Gear

5 Tons Capacity and Larger

Capacity Inside
of Lining.

2000 lbs.
2500 "
3000 "
4000 "
5000 "
6000 "
8000 "
10000 "
12000 "
14000 "

Standard reservoir ladles are intended for permanent location in front of the cupola to receive metal as tapped out and serve as a mixer to insure uniform character of iron. The illustration shows construction for the larger capacities. Bowl has greater top space provided than for crane ladles to allow for extra accumulation of slag. Lip is therefore cut out as shown and may be provided with skimming attachment if desired.

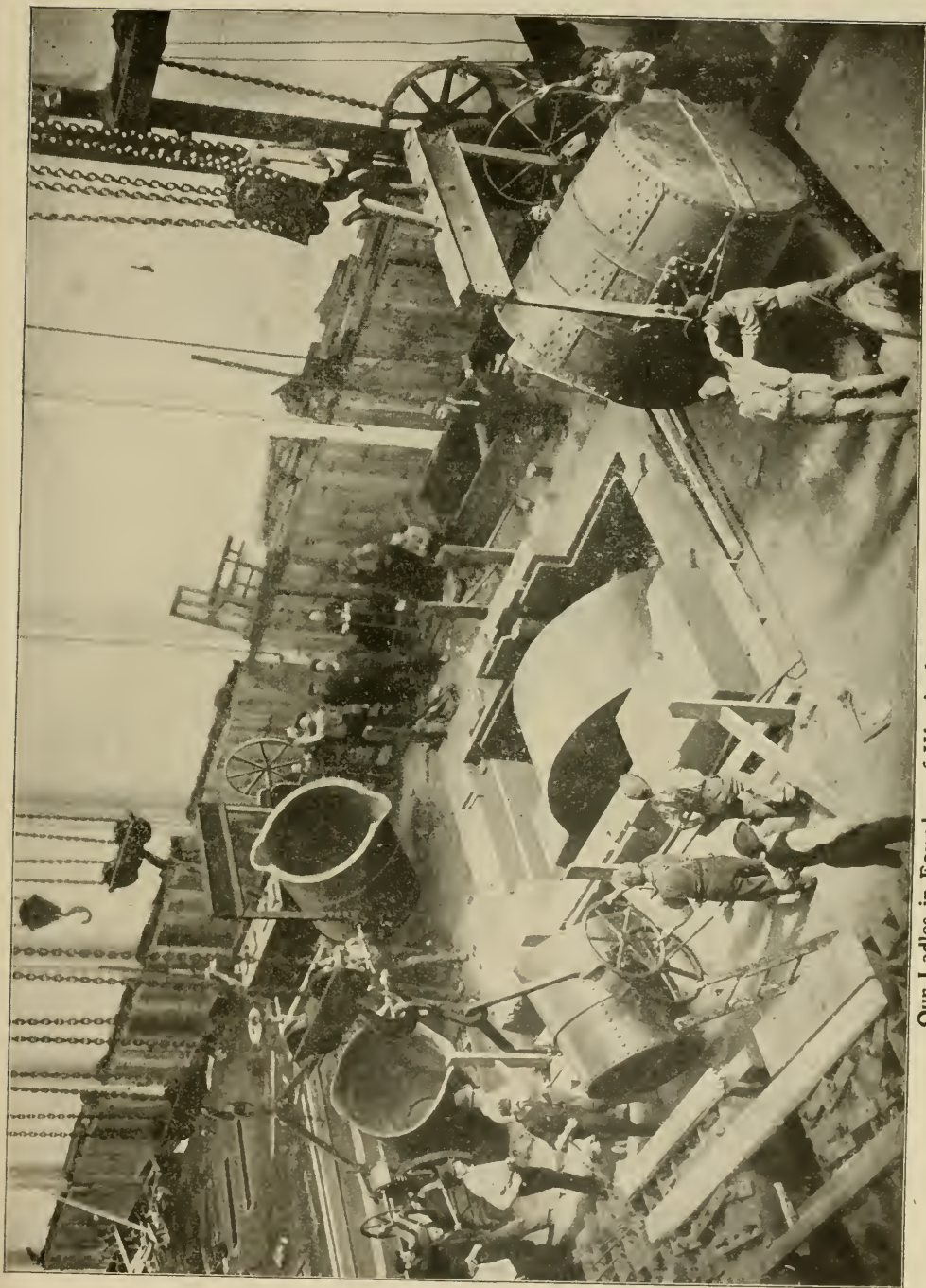
For capacities of *five* tons and larger, angle bar is fitted around the top of shell to support brick lining.

More of our Ladles are in use than all others Combined
They are the Standard

DIMENSIONS AND PRICES OF LADLES DESCRIBED IN PRECEDING PAGES

Capacity In- side of Lining, Etc., in Pounds	Dimensions.				Allowances For Lining, Etc.			Thickness of Metal in Bowl.	List Prices.			Geared Crane Ladles.		Standard Truck Ladles.	
	Top Diam. Inches.	Bottom Inches.	Depth, Inches.	Side, Inches.	Bottom Inches.	Top Space Inches.	Bowl Only.		Bowl and Bowl Shank and Bail.	Pin Spur Gear.	Worm Geared.	Geared.	Shank.		
30	7	6	7	1 1/2	1 1/2	3/4	\$ 1 00	\$ 2 50	.	.	.	.	.	.	.
50	8	7	8	1 1/2	1 1/2	3/4	1 25	2 75	.	.	.	.	.	.	.
75	9	8	9	1 1/2	1 1/2	3/4	1 50	5 50	.	.	.	.	.	.	.
100	10	8 3/4	10	1 1/2	1 1/2	3/4	2 00	7 75	.	.	.	.	.	.	.
150	11	9 3/4	11	1 1/2	1 1/2	1	2 65	8 75	\$10 00	.	.	.	.	.	.
200	12	10 1/2	12	1 1/2	1 1/2	1	3 75	9 50	11 00	.	.	.	.	.	.
250	13	11 1/4	13	1 1/2	1 1/2	1	4 20	11 00	13 00	.	.	.	.	.	.
300	14	12 1/4	14	1 1/2	1 1/2	1 1/4	4 40	11 50	13 50	.	.	.	.	.	.
400	15	13	15	1 3/4	1 1/4	1 1/4	5 50	13 50	15 70	.	.	.	.	.	.
500	16 1/2	14 1/2	16 1/2	1 3/4	1 1/4	1 1/4	7 20	15 00	18 00	.	.	.	.	.	.
600	17 1/2	15 1/2	17 1/2	1 3/4	1 1/4	1 1/4	8 50	17 50	20 00	.	.	.	.	.	.
800	19	16 1/2	19	1 3/4	1 1/4	1 3/4	10 00	18 80	22 50	.	.	.	.	.	.
1,000	20 1/2	18	20 1/2	1	1 1/2	2	11 50	25 00	30 00	.	.	.	.	.	\$ 78 00
1,200	21 3/4	19	21 3/4	1	1 1/2	2	12 00	28 00	33 00	.	.	.	.	.	\$ 80 00
1,500	23	20	23	1	1 1/2	2	15 00	32 00	38 00	.	.	.	.	.	\$ 84 00
1,800	24 1/2	21 1/2	24 1/2	1	1 1/2	2	18 00	38 00	44 00	.	.	.	.	.	\$ 90 00
2,000	26	22 3/4	26	1	1 1/2	2 1/2	22 00	40 00	48 00	.	.	.	.	.	\$ 96 00
2,500	27 1/2	24	27 1/2	1	1 1/2	2 1/2	.	48 00	.	.	.	.	.	.	\$ 100 00
3,000	29	25 1/2	29	1	1 1/2	2 1/2	.	54 00	.	.	.	.	.	.	\$ 106 00
4,000	32	28	32	1	1 1/2	3	.	58 00	.	.	.	.	.	.	\$ 110 00
5,000	34 1/2	30 1/4	34 1/2	1 1/2	2	3	.	.	.	.	.	.	.	.	\$ 122 00
6,000	36 1/2	32	36 1/2	1 1/2	2	3 1/4	.	.	.	.	.	.	.	.	\$ 148 00
8,000	40 1/2	35 1/2	40 1/2	1 3/4	2 1/2	3	.	.	.	.	.	.	.	.	\$ 184 00
10,000	43 1/2	38	43 1/2	1 3/4	2 1/2	4	.	.	.	.	.	.	.	.	\$ 228 00
12,000	46	40 1/2	46	1 3/4	2 1/2	4	.	.	.	.	.	.	.	.	\$ 250 00
14,000	48 1/2	42 1/2	48 1/2	2 1/2	3	4	.	.	.	.	.	.	.	.	\$ 267 00
16,000	55	48	55	4 1/2	5	4	.	.	.	.	.	.	.	.	\$ 300 00
20,000	58	51	58	4 1/2	5	4	.	.	.	.	.	.	.	.	\$ 360 00
24,000	62	54	62	4 1/2	5	4 1/2	.	.	.	.	.	.	.	.	\$ 525 00
30,000	66	58	66	4 1/2	5	5	.	.	.	.	.	.	.	.	\$ 690 00
40,000	72	63 1/2	72	4 1/2	5	5	.	.	.	.	.	.	.	.	Special.

We can furnish HAND LADLE SHANKS made of GAS PIPE if desired; add one dollar extra to above list on 30 or 50 lbs. capacity. Ladles in stock up to 10,000 lbs. capacity.



Our Ladles in Foundry of Westinghouse Machine Co., East Pittsburgh, Pa.



FOR THE VERY LATEST ACHIEVEMENTS IN

Exhaust Tumbling Mills

Foundry Appliances and Arrangements to Eliminate Extra
Trouble, Investigate Our Plans to Clean, Polish,
Brighten and Make Smooth Castings

THEY CAN BE ADAPTED TO ANY VARIETY OF IRON, BRASS
AND STEEL CASTINGS AND WROUGHT METAL WORK

All Kinds, Sizes, Styles and Makes
For All Kinds of Castings, Large or Small



SPECIAL MILLS CONSTRUCTED
FOR SPECIAL WORK

See following pages.

THE STOVER EXHAUST TUMBLING BARREL

Superior to any in use for Light Castings, Malleable Iron, Wire Nails, Forgings or any other Small Articles Requiring Cleaning or Polishing.

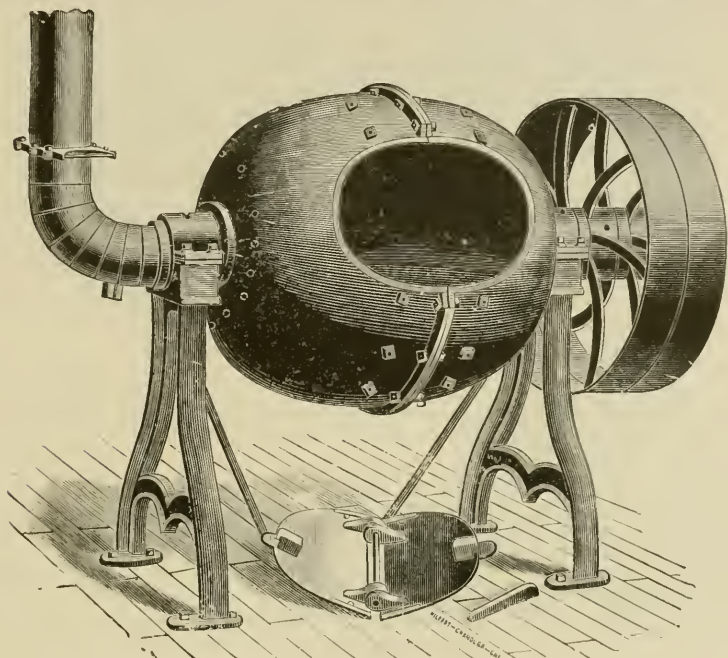


FIG. 307

By noticing the cut it will be seen that the barrel is egg shaped; that it has a section of exhaust pipe connected to the hollow journal at one end, and a tight and loose pulley at the other end. No gearing whatever is used. Special advantages are found in the egg shape.

No. 1 is lined with white iron, which can be replaced when worn out.

Dimensions and Price List

Size.	No. 1. Inches.	No. 2. Inches.	No. 3. Inches.	No. 4. Inches.
Diameter of journal for pipe. .	5 1/4	5 1/4	3	5 1/4
Diameter inside of barrel . . .	27	20	16	20 x 40
Length over all.	56	51	44	64
Length between bearings . .	38	33	26	44
Pulleys	4 1/2 x 30	4 1/2 x 30	4 x 24	4 1/2 x 30
Height from floor to center . .	32	32	30	32
Opening in barrel	13 x 19	11 x 15	7 1/4 x 10	13 1/2 x 39
Speed—revolutions per minute	45	45	45	45
Weight—pounds	1,375	740	430	
Price	\$150 00	\$120 00	\$100 00	\$140 00

Barrels ordered in pairs are supplied with a yoke to join them together without extra charge. The best low priced Tumbler manufactured.

FRICTION TUMBLERS

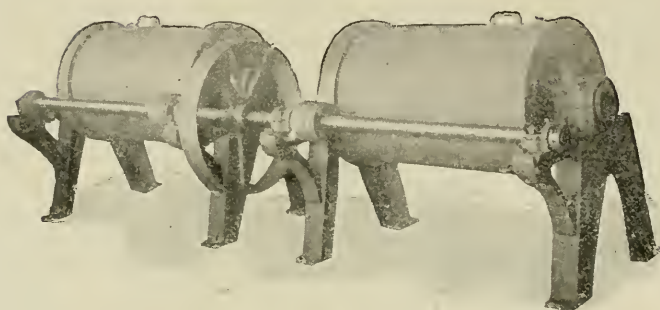


FIG. 308

Two Friction Tumblers Driven from One Pulley (Back View)

A well made, practical and heavy machine of few parts. Two or more tumblers may be run from one pulley, and one or more may be stopped at will without interfering with the running of the others. Barrels are stopped and started by turning a hand screw, drawing the head of barrel back from the friction. Barrels are circular outside and octagonal inside. Each barrel has removable inside head liners with countersunk bolts. Trunnions turn in self-aligning bearings.

Supplied with our extra hard iron staves only. These staves out-last steel.

Cover removed without taking out bolts, and by turning two lugs in one end.

Supplied with extra high standards and made extra heavy throughout.

No.	Dimensions Inside of Barrel.		Approximate Floor Space.	Standard Size of Pulley (For One Machine.)	Price, Each.
	Diameter.	Length.			
10	16 in.	28 in.	2 ft. 3 in. x 3 ft. 9 in.	14 in. x 2½ in.	\$ 76 00
12	16 "	36 "	2 " 3 " x 4 " 5 "	14 " x 2½ "	84 00
14	20 "	32 "	3 " 0 " x 4 " 6 "	16 " x 3½ "	116 00
16	20 "	42 "	3 " 0 " x 5 " 4 "	16 " x 3½ "	124 00
18	24 "	36 "	3 " 6 " x 4 " 10 "	18 " x 3½ "	136 00
20	24 "	48 "	3 " 6 " x 5 " 10 "	18 " x 3½ "	148 00

Especially adapted for small light work.

ROLLER DRIVE TUMBLER

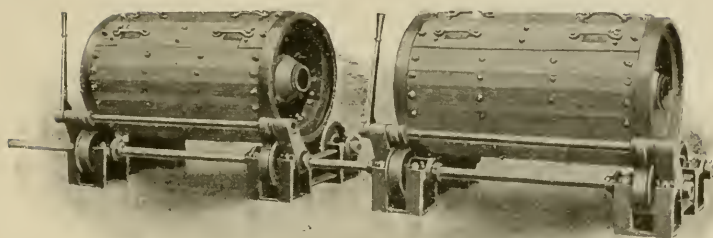


FIG. 309

An Exceedingly Efficient, Durable, and Easy Running Machine

The barrel is entirely independent of the roller drivers, merely resting thereon. Two wheels are drivers, keyed to the same shaft, and two wheels are idlers. The faces of the four wheels and two tumbler heads which form the wearing surfaces are chilled and the barrel is arranged to get equal contact with each wheel. To stop the mill it is only necessary to pull the lever arm, to which is attached a cam, thus lifting the barrel off the driver wheels and stopping it at any desired position. Flanges are provided on the wheels and set collars, with a corresponding recession in the box cap, so that the bearings are completely covered and no dust can enter them. The barrel is arranged for attaching exhaust pipe if desired. Barrel has inside removable head liners held by countersunk bolts, and is furnished with cast iron staves (steel lined) or steel plate shell, as desired. In case of an accident to the barrel, it can be removed from the driving wheels to a convenient place for repairs and an extra barrel placed on the machine.

These barrels are built in the following standard sizes.

They Can Be Made in Any Length Required

No.	Dimensions Inside of Barrel.		Approximate Floor Space.
	Diameter.	Length.	
80	26 in.	36 in.	3 ft. 0 in. x 5 ft. 6 in.
82	26 "	48 "	3 " 0 " x 6 " 6 "
84	30 "	36 "	3 " 3 " x 5 " 6 "
86	30 "	48 "	3 " 3 " x 6 " 6 "
88	36 "	48 "	4 " 0 " x 6 " 6 "
90	36 "	60 "	4 " 0 " x 7 " 6 "
92	42 "	60 "	4 ¹ / ₂ " 0 " x 7 " 6 "
94	42 "	72 "	4 ¹ / ₂ " 0 " x 8 " 6 "
96	48 "	60 "	5 " 0 " x 7 " 6 "
98	48 "	72 "	5 " 0 " x 8 " 6 "

Built to Withstand Rough Usage

Recommended for Cleaning Light and Medium Castings

SPUR GEARED TUMBLERS

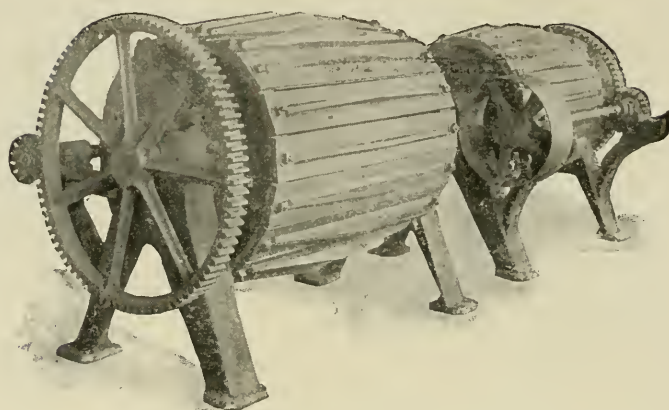


FIG. 310

Tumblers, Spur Geared. (Front and Back Views.)

An extra heavy machine with iron staves and removable head liners. Staves are bolted in place. The removable staves have bolt holes; slotted and swinging eye bolts are used to hold them in place, a detail which should be appreciated. Trunnions are extra heavy, bolted to heads and easily renewable. Turn in steel roller bushings.

These tumblers are driven by tight and loose pulleys and spur gearing, and movements are controlled by shifting the belts.

The iron used in the staves is of a specially hard mixture. The feature of renewable wearing parts deserves careful attention and adds materially to the efficiency and life of the machine.

No.	Dimensions Inside of Barrel.		Approximate Floor Space.	Standard Size of Pulley For One Tumbler.	Price, Each.
	Diameter.	Length.			
30	24 in.	36 in.	3 ft. 6 in. x 5 ft. 2 in.	18 in. x 3 1/2 in.	\$140 00
32	24 "	48 "	3 " 6 " x 6 " 2 "	18 " x 3 1/2 "	160 00
34	28 "	40 "	3 " 6 " x 6 " 0 "	20 " x 4 1/2 "	186 00
36	28 "	48 "	3 " 6 " x 6 " 8 "	20 " x 4 1/2 "	210 00
38	36 "	48 "	4 " 6 " x 7 " 9 "	20 " x 5 1/2 "	276 00
40	36 "	60 "	4 " 6 " x 8 " 9 "	24 " x 5 1/2 "	312 00
42	42 "	56 "	5 " 0 " x 8 " 6 "	24 " x 5 1/2 "	410 00
44	42 "	72 "	5 " 0 " x 9 " 10 "	30 " x 5 1/2 "	450 00

We manufacture a line of tumblers without renewable wearing parts in same sizes as above at lower figures. Send for prices on **Style B Tumblers**. These are the old reliable Tumbling Mills.

FRICTION GEAR TUMBLERS WITH CONVEX FACES

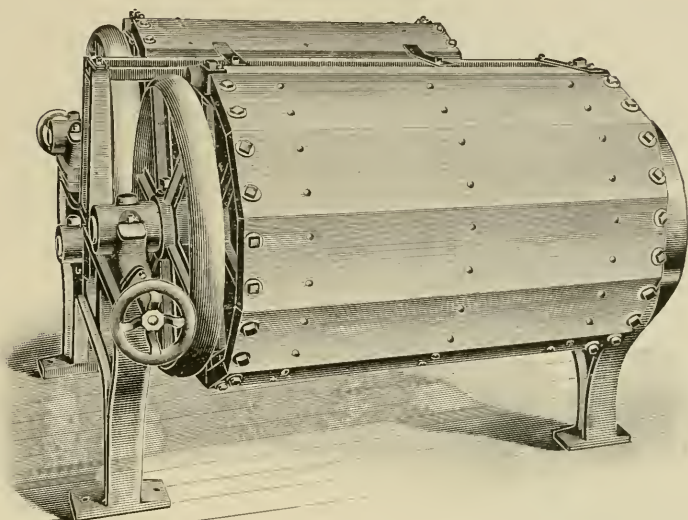


FIG. 311

One Pair, Size, 26 x 36 Inches. (Mounted.)

Wood Stave, Steel Lined Tumbling Barrels

Exhaust or Non-Exhaust

No. of Staves.	Approx. Diam. and Length Inside.	Weight.	Price Per Pair	No. of Staves.	Approx. Diam. and Length Inside.	Weight.	Price Per Pair
6	14 x 30 in.	1620 lbs.	\$200 00	9	20 x 42 in.	2350 lbs	\$280 00
6	14 x 36 "	1670 "	210 00	10	22 x 30 "	2260 "	270 00
6	14 x 42 "	1750 "	220 00	10	22 x 36 "	2360 "	280 00
7	16 x 30 "	1820 "	220 00	10	22 x 42 "	2460 "	290 00
7	16 x 36 "	1900 "	230 00	11	24 x 36 "	2700 "	330 00
7	16 x 42 "	1978 "	240 00	11	24 x 42 "	2800 "	344 00
8	18 x 30 "	1860 "	220 00	11	24 x 48 "	3000 "	360 00
8	18 x 36 "	1960 "	236 00	12	26 x 36 "	2920 "	350 00
8	18 x 42 "	2075 "	250 00	12	26 x 42 "	3000 "	370 00
9	20 x 30 "	2190 "	260 00	12	26 x 48 "	3148 "	390 00
9	20 x 36 "	2270 "	270 00				

The above prices include barrels arranged for exhaust.

As many *barrels* as may be desired can be placed in line, *singly* or in *pairs* and be driven by one belt.

Tumblers of special form or size made to order. Prices quoted on application, on any specified number of barrels.

FRICITION GEAR TUMBLERS

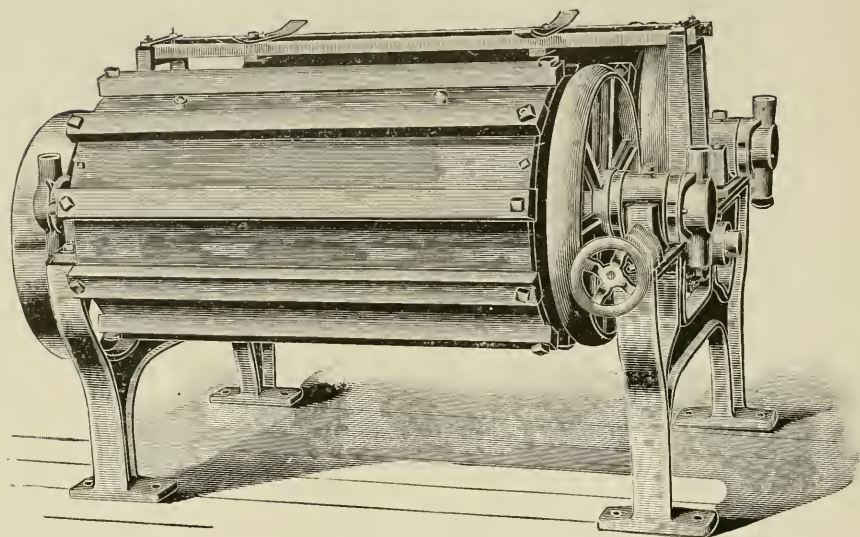


FIG. 312

Steel Plate, Double Exhaust, Friction Geared

Also Furnished Non-Exhaust

Size		Weight.	Price Per Pair.
18 inches diameter	32 inches long.	1,940	\$240 00
22 " "	38 " "	2,400	280 00
22 " "	44 " "	2,520	300 00
26 " "	38 " "	2,825	360 00
26 " "	44 " "	2,970	390 00

These Barrels are made with Cast Iron Staves when so ordered.

Built to run singly, in pairs or in batteries.

Specify arrangement desired when ordering.

Secure information regarding our Sand Blast Apparatus.

BARREL FOR STOVE PLATES AND SIMILAR ARTICLES (Patent Double Exhaust)

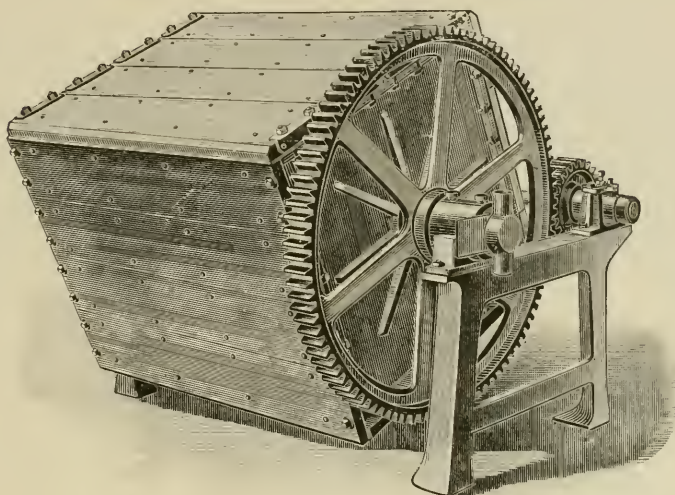


FIG. 313

Size.		Weight.	Price.
37 inches square	48 inches long.	3,000	\$400 00
31 " "	42 " "	2,380	310 00
23 " "	42 " "		Special.

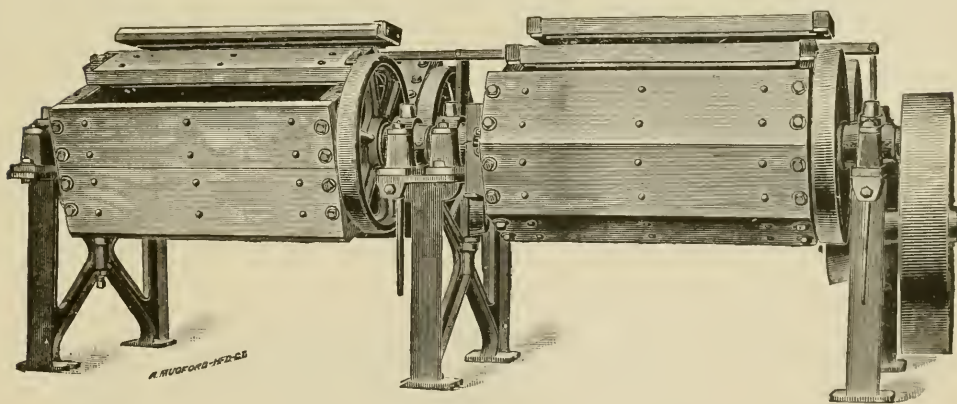


FIG. 314

Illustration of Barrels of Different Kinds Mounted Together.

Square Sizes.	Weight.	Price Per Pair.	Rectangular Sizes.	Weight.	Price Per Pair.
14 sq., 30 in. long	1870 lbs.	\$220 00	18 x 24 , 30 in. long.	.....	Special.
16 sq., 30 in. long	2000 "	234 00	18 x 33½, 42 in. long.	...	Special.
18 sq., 30 in. long	2170 "	250 00			
23 sq., 30 in. long	2750 "	340 00			

These mills can be fitted with an exhaust fan to carry away the dust.

SET OF FOUR TUMBLING BARRELS

Exhaust or Non-Exhaust

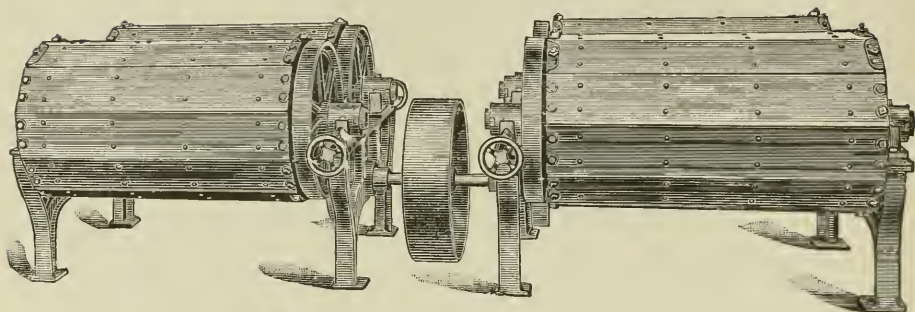


FIG. 315

Size, 24 x 42 inches. Weight, 5,800 pounds.

Friction geared with hand wheels for stopping and starting each barrel; an excellent way of mounting and driving four heavily loaded barrels.

No. of Staves.	Size.	Weight.	Price Per Pair.	No. of Staves.	Size.	Weight.	Price Per Pair.
6	14 x 30 in.	1620	\$200 00	9	20 x 42 in.	2350	\$280 00
6	14 x 36 "	1670	210 00	10	22 x 30 "	2260	270 00
6	14 x 42 "	1750	220 00	10	22 x 36 "	2360	280 00
7	16 x 30 "	1820	220 00	10	22 x 42 "	2460	290 00
7	16 x 36 "	1900	230 00	11	24 x 36 "	2700	330 00
7	16 x 42 "	1980	240 00	11	24 x 42 "	2800	345 00
8	18 x 30 "	1860	220 00	11	24 x 48 "	3000	360 00
8	18 x 36 "	1960	236 00	12	26 x 36 "	2920	350 00
8	18 x 42 "	2070	250 00	12	26 x 42 "	3000	370 00
9	20 x 30 "	2190	260 00	12	26 x 48 "	3150	390 00
9	20 x 36 "	2270	270 00				

Made in compartments to order.

Non-Exhaust \$10.00 less per pair.

HARD IRON STARS

Hard Iron Stars for Rumbling



FIG. 316

Small 15 cents per lb.
 Medium 10 " "
 Large 10 " "

These are always furnished in malleable iron unless otherwise specified.

A DOUBLE BARREL FOR DRY ROLLING

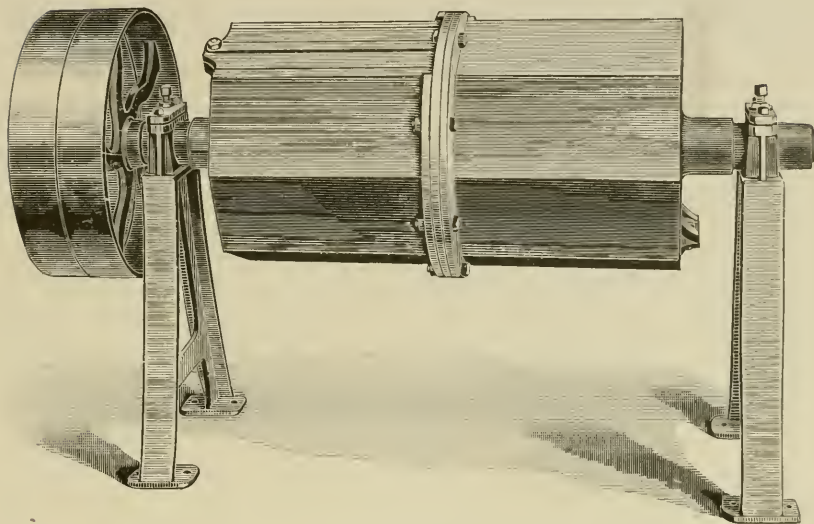


FIG. 316

Diameter of Each Compartment.	Length.	Approximate Weight.	Price.
20 inches	23 inches	1,200 pounds	\$190.00
20 "	18 "	1,000 "	160.00

This octagonal pattern is also used for compartment water polishing barrels. Compartment made longer if desired.

PRAIRIE HAY ROPE

For Making Cores

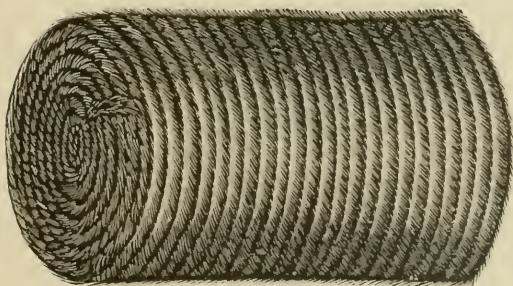


FIG. 317

1 to 5 Spools . \$3.50 each
 5 " 10 " . 3.00 "
 10 " 20 " . 2.75 "

Each spool contains from 300 to 350 feet.

We also keep in stock Bailed Prairie Hay.

**IMPROVED FOUNDRY
TUMBLING
BARRELS**

These barrels have no shaft through them (none of our barrels have) against which the work could get wedged. In strength and capacity they are well adapted for large, heavy work; also for sprues and cupola dumpings.

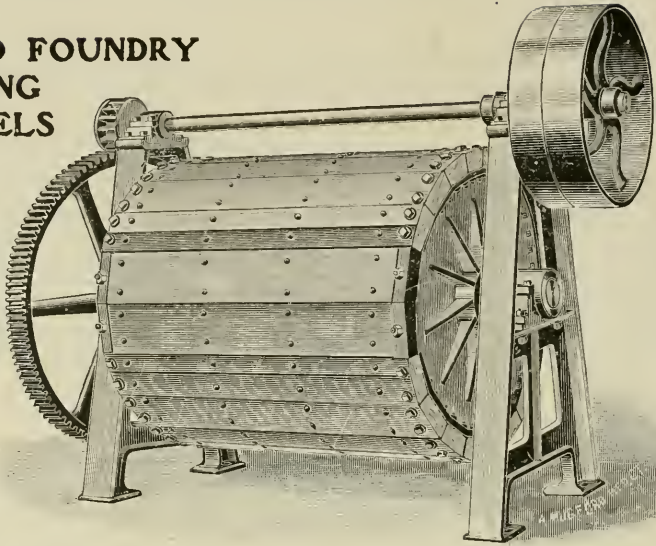


FIG. 318

No. of Staves, 20; size inside, 45 x 48 in.; approximate weight, 4,780 lbs. . . \$600.00
Other sizes furnished upon inquiry.

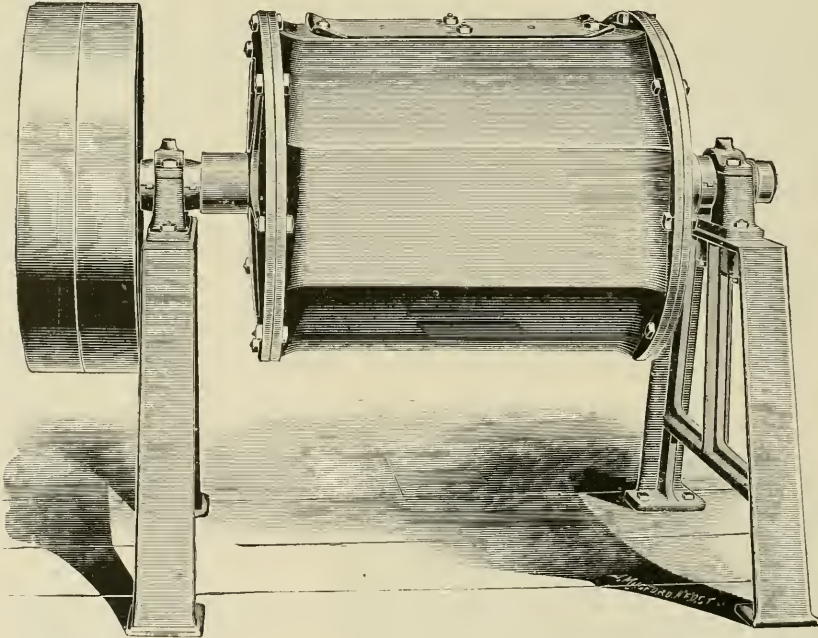


FIG. 319

For Wet or Dry Tumbling, Well Adapted for Brass Castings

Size, 26 x 30 inches; weight, 1,520 lbs. \$200.00

When intended to be used with water, it is made with a watertight door and a gland for water pipe connections.

TILTING DOUBLE BARREL OBLIQUE MACHINE

Patent
Friction
Geared

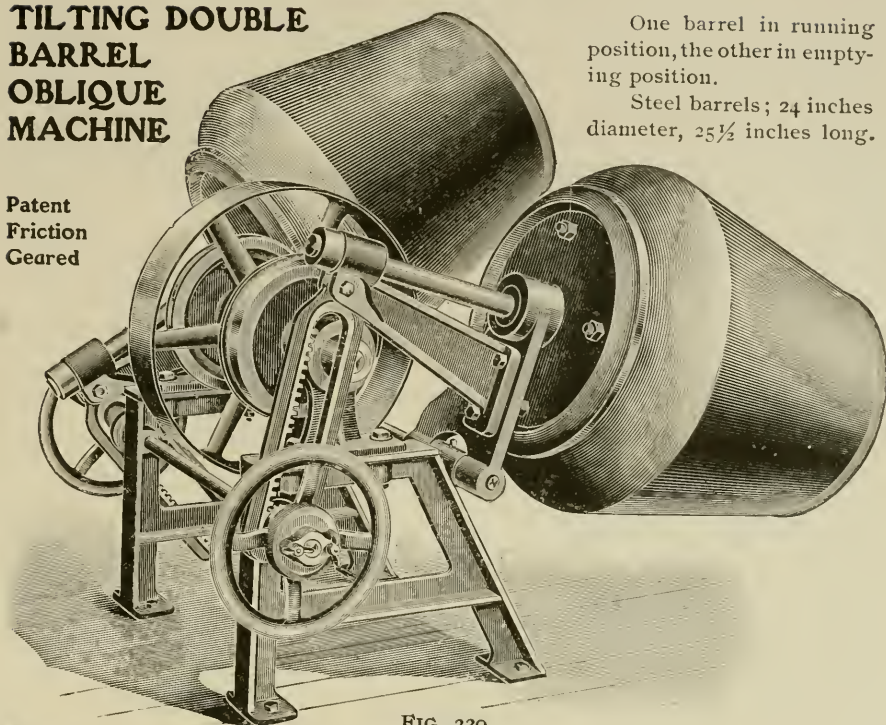


FIG. 320

One barrel in running position, the other in emptying position.

Steel barrels; 24 inches diameter, 25½ inches long.

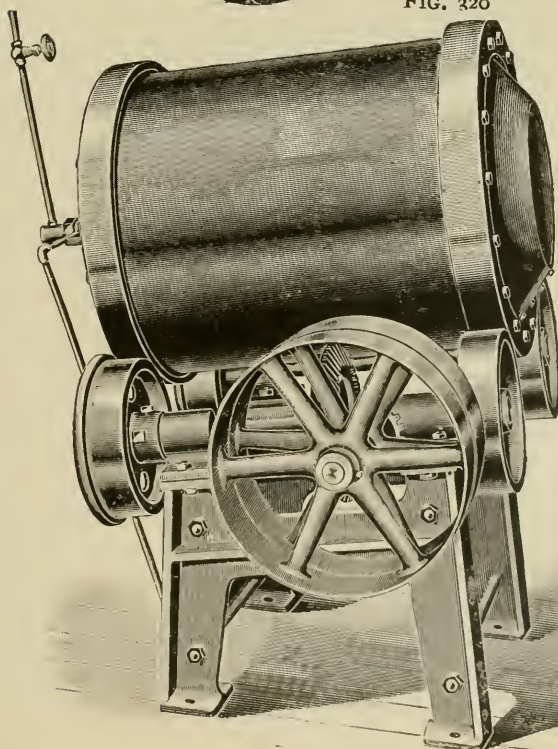


FIG. 321

Floor space, 4½ x 5 ft.
Larger or smaller barrels of brass, steel or wood can be used on this machine.

Approximate weight, 1,175 lbs.

Price, \$260.00

Steam Heated Tumbling Barrels.

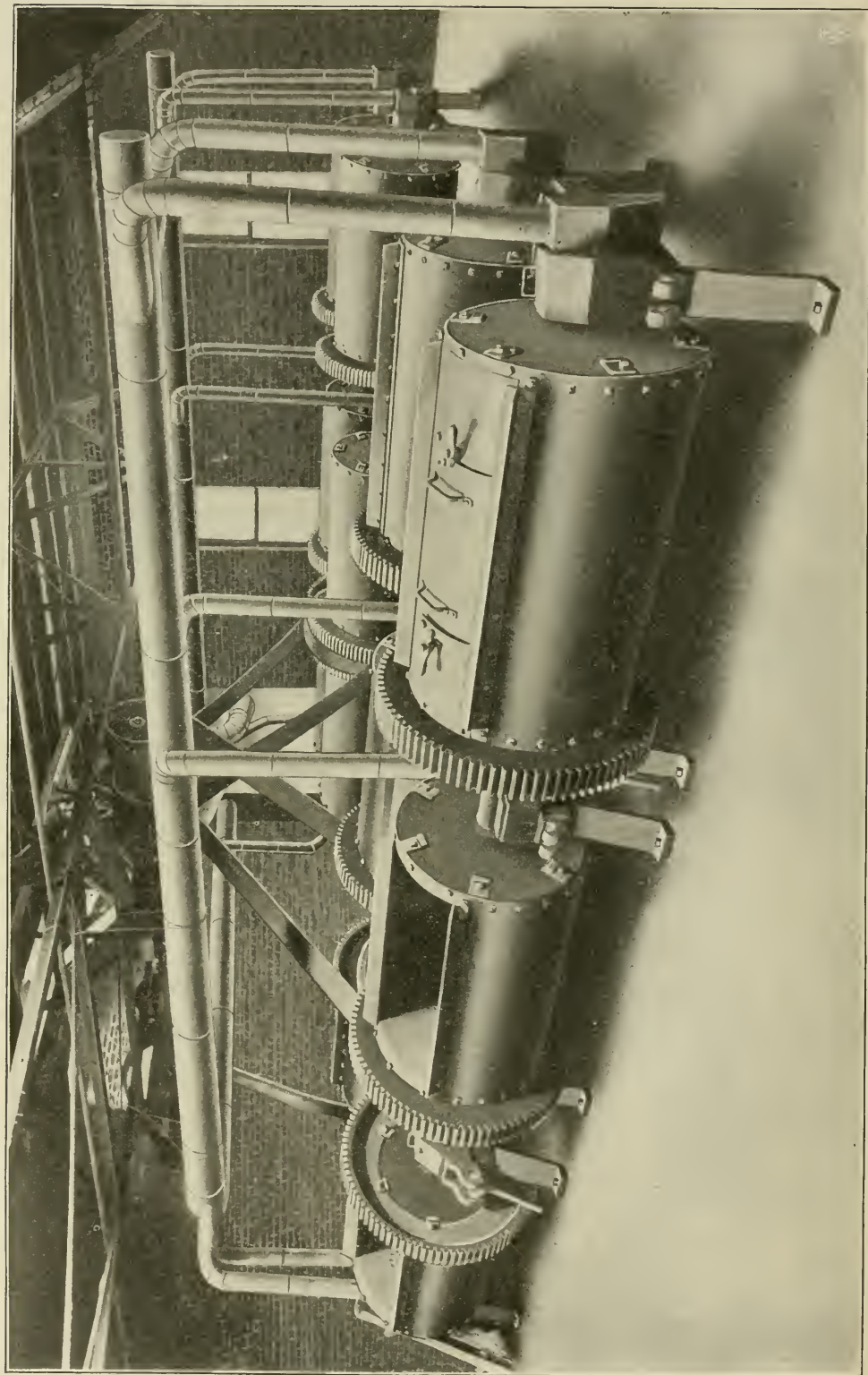
For Drying Metal Goods
In Hot Sawdust.

22 in. diam.
x 30 in. long
inside.

Floor space, 4
ft. x 4 ft.

Weight, 1,150
lbs.

Price, \$320.00



Steel Plate Tumblers showing Exhaust System. Shafing furnished for connections when desired.

THE OBERMAYER SAND BLAST APPARATUS

Which is rapidly coming into use for cleaning Iron,
Steel and Brass Castings

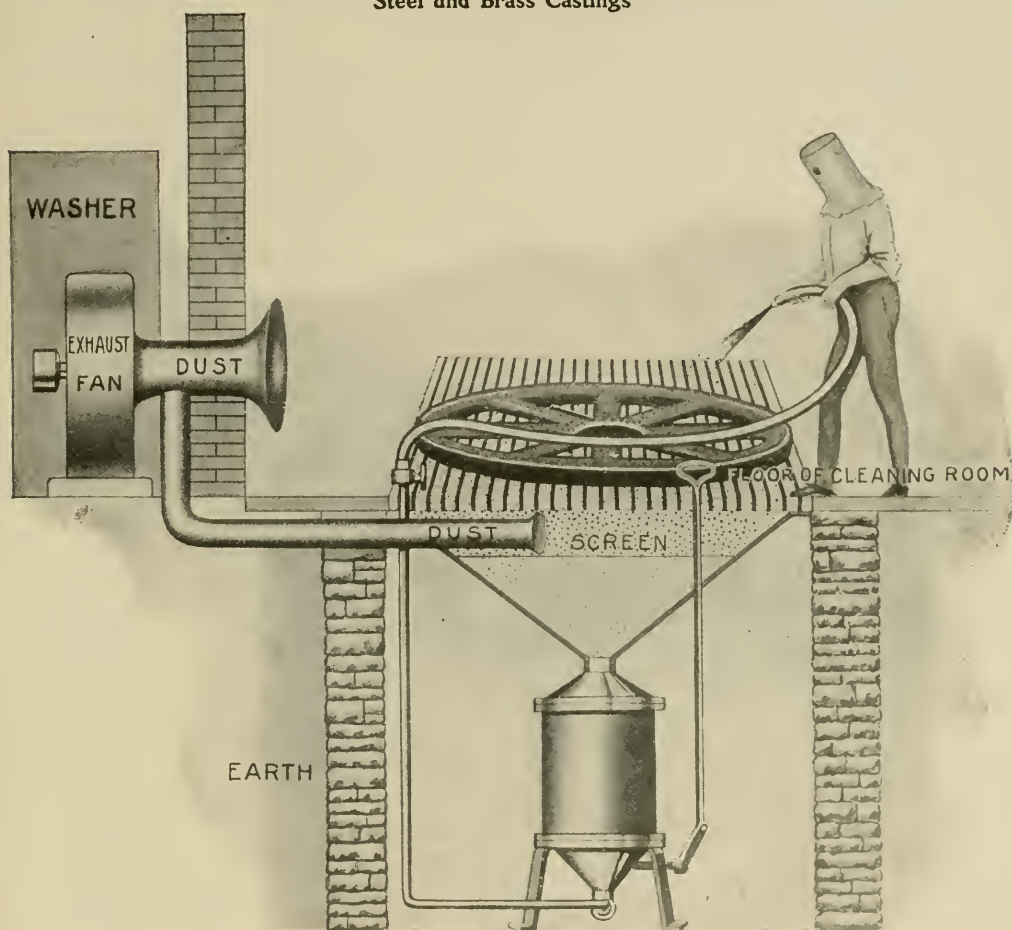


FIG. 323

We have had a great number of inquiries concerning our Sand Blast Machines, and to meet the demands of the trade, have made many experiments at great expense. We present to the trade an apparatus which is operated by compressed air and recommend, especially for light work, our **Pony** size or Portable Machine. If you have compressed air in your foundry it will pay you to investigate the merits of this device. It is made in five sizes and can be adapted for all classes of work. The Blast or discharge nozzle is held in the hand of the operator and directed against the surface to be cleaned. The saving that this Machine will show will pay for the outfit in a few months' time.

One man with the Sand Blast will do more cleaning than five or six men with wire brushes. In addition, core work can be reached that is inaccessible in any other way.

The chief advantage in the use of the Sand Blast Machine over the ordinary method of brushing, barreling or pickling, is that it does the work thoroughly. It not only cleans the castings readily, but gives them a brighter surface when finished, and in no way impairs the quality or nature of the castings.

Our Machine is composed of a single shell, and every part is accessible so that all pieces liable to wear can be easily replaced, most of them by ordinary pipe fittings. The pressure and volume of air required depends on the class of work and the size of nozzle employed, but allowance should be made for wear and tear. The Machine should be used, with from 8 to 10 pounds pressure, for light work. The pressure must be greater, ranging from 25 to 30 pounds per square inch for heavy work or steel castings. The following table shows the size of nozzle necessary to secure proper distribution and the approximate amount of air required at the given pressure:

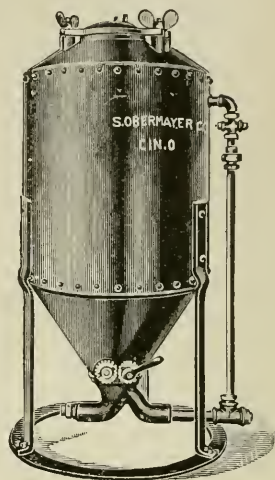


FIG. 324

Diam. of Nozzle.	Pounds Pressure Per Square Inch.				
	10	15	20	30	
$\frac{3}{8}$	20	25	30	35	} Approximate cubic feet of free air per minute.
$\frac{3}{4}$	30	40	50	60	
$1\frac{1}{8}$	55	70	80	100	
$1\frac{3}{8}$	88	100	125	150	
$1\frac{1}{2}$	140	175	200	250	
$1\frac{3}{4}$					

A small room is sufficient for cleaning castings of medium weight which two men can handle efficiently. In large plants Foundrymen install an Exhaust System by the arrangement of an Exhaust Fan to carry away the dust which is conveyed to a dust collector. Cranes should be used to handle heavy work to advantage.

When writing for prices, advise us the kind of work, the quantity of castings in tons per day which you desire to clean, also whether belt or steam pressure for air compressor is required, and we can then give you approximate idea of the cost.

Prices Given on Application

OBERMAYER'S CYCLONE DUST COLLECTOR

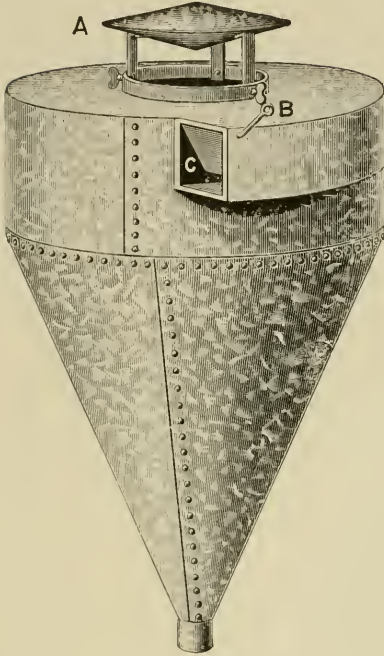


FIG. 325

Our Cyclone Dust Collector is designed upon principles that enable us to offer a perfect working machine with a large enough air outlet to insure perfect freedom of discharge from the fan and thus avoid loss of power in forcing air through extra resistance, or loss of suction by reason of the resistance.

The illustration shows our left-hand collector, and we can guarantee these Dust Collectors to allow your fan to work to full capacity without wasting power for the extra speed. These Collectors are arranged with an automatic valve, which prevents any portion of the material from returning into the pipes. The capacity of our Dust Collector is in proportion to the diameter of the air outlet at the top. The inlet can be arranged on either side desired.

We build to suit your conditions when advised of your requirements.

No. 4	\$ 15.00	No. 16	\$225.00
" 5	20.00	" 18	250.00
" 6	40.00	" 20	275.00
" 7	60.00	" 22	350.00
" 8	80.00	" 24	400.00
" 9	90.00	" 26	475.00
" 10	125.00	" 28	550.00
" 12	175.00	" 30	600.00
" 14	200.00	" 32	700.00

Correspondence solicited. Write for discounts.

BUFFALO "B" VOLUME EXHAUSTERS

For the Cleaning Room

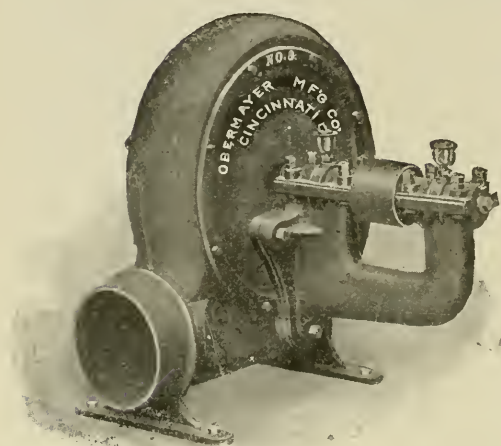


FIG. 326

heavy gauge to resist the wearing effect upon it. After passing through the blower, the refuse may be discharged out of doors or else into a vat of water in such a way as to enable the sediment to be collected from time to time, as described in previous pages.

Buffalo Standard Oil-Ring Bearings are applied to Buffalo Blowers and Exhausters. Such bearings have been found to be essential for this service and the particular form which is here employed insures the most thorough lubrication and cool running at sustained high speeds. Adequate provision is made for cleaning and refilling the bearings when occasion demands.

Unless otherwise particularly mentioned, the standard Right Hand Bottom Horizontal Discharge Blower or Exhauster will be furnished, and hence all special fans must have their hand and discharge specified. The hand of a fan or blower is determined by the side on which the pulley is located. Standing facing or nearest to the discharge outlet, the fan is right or left hand according to whether the pulley is on the right or left hand side.

In ordering blast wheels, customers will avoid much delay by stating exactly the size and kind of blower for which the blast wheel is intended, as well as detailing the various dimensions; also refer to the shop number stamped on the shaft or bearing.

In the case of forge shop, emery wheel, tumbling barrels and other like installations, it is always well to give in detail the number, size and nature of all machines to be served, together with their relative location and the desired position of the fan.

The application of Buffalo "B" Volume Exhausters for the purpose of removing the refuse from emery wheels, buffing wheels, or the machines of any abrasive processes, has been most extensive, and in view of its simplicity and efficacy is the best solution of the problem of preventing the dissemination or accumulation of undesirable refuse, or of saving those particles of abraded material, which are of sufficient value to render such a course advisable.

In applying such an exhaust system care must be taken to have the piping of adequate diameter and with as few bends as possible. All pockets or obstructions in the pipe must be strenuously avoided and the stock employed for the piping itself should be of a

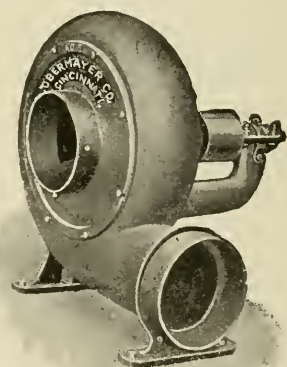
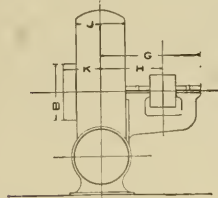
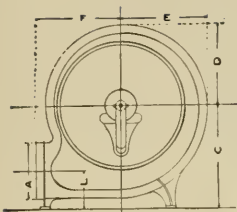


Fig. 327

Table of Prices and Dimensions of "B" Volume Exhausters



No.	A	B	C	D	F	G	H	J	K	L	Pulley		Price.
											Dia.	Face	
000	5 $\frac{1}{8}$	5 $\frac{1}{16}$	9	5 $\frac{3}{4}$	8 $\frac{5}{8}$	11 $\frac{3}{4}$	7 $\frac{1}{2}$	3 $\frac{1}{4}$	3	3 $\frac{1}{4}$	2 $\frac{3}{4}$	2 $\frac{1}{4}$	\$15 00
I	4 $\frac{7}{8}$	5 $\frac{3}{4}$	9	6 $\frac{7}{8}$	9 $\frac{7}{8}$	10 $\frac{7}{8}$	6 $\frac{1}{8}$	4	3 $\frac{3}{4}$	3 $\frac{9}{16}$	3	2 $\frac{1}{2}$	20 00
2	6 $\frac{1}{16}$	6 $\frac{1}{16}$	11 $\frac{3}{4}$	8 $\frac{3}{4}$	11 $\frac{1}{4}$	14 $\frac{1}{2}$	9 $\frac{1}{4}$	4 $\frac{7}{8}$	5	4 $\frac{1}{16}$	3 $\frac{1}{4}$	2 $\frac{5}{8}$	25 00
3	7 $\frac{7}{8}$	7 $\frac{1}{2}$	14	10 $\frac{1}{16}$	13 $\frac{5}{8}$	18 $\frac{1}{8}$	11 $\frac{1}{8}$	5 $\frac{7}{8}$	5 $\frac{3}{8}$	5 $\frac{3}{4}$	4	3	33 00
4	9	9	15 $\frac{7}{8}$	12 $\frac{1}{16}$	14 $\frac{1}{16}$	19 $\frac{3}{8}$	12	6 $\frac{3}{8}$	5 $\frac{3}{4}$	6	5	3 $\frac{7}{8}$	44 00
5	10 $\frac{5}{8}$	10 $\frac{5}{8}$	18	13 $\frac{3}{8}$	17 $\frac{1}{4}$	23 $\frac{3}{4}$	14 $\frac{1}{4}$	7 $\frac{3}{4}$	7	6 $\frac{3}{16}$	5 $\frac{3}{4}$	4 $\frac{5}{8}$	55 00
6	11 $\frac{1}{8}$	12 $\frac{1}{8}$	20 $\frac{3}{8}$	16 $\frac{3}{4}$	19 $\frac{7}{8}$	25 $\frac{3}{8}$	15 $\frac{3}{8}$	8 $\frac{7}{8}$	7 $\frac{3}{8}$	7 $\frac{3}{8}$	6 $\frac{1}{2}$	5 $\frac{1}{4}$	70 00
7	14	14	23 $\frac{7}{8}$	18 $\frac{3}{4}$	22	28	16 $\frac{1}{2}$	10 $\frac{3}{8}$	8 $\frac{7}{8}$	8 $\frac{1}{16}$	7 $\frac{1}{2}$	6 $\frac{1}{4}$	90 00
8	16 $\frac{3}{8}$	16 $\frac{3}{8}$	25 $\frac{7}{8}$	21 $\frac{1}{4}$	24 $\frac{1}{8}$	30 $\frac{3}{8}$	18 $\frac{1}{4}$	11 $\frac{7}{8}$	9 $\frac{3}{8}$	9 $\frac{1}{16}$	8 $\frac{1}{2}$	7 $\frac{1}{4}$	150 00
9	17 $\frac{7}{8}$	17 $\frac{1}{4}$	30 $\frac{1}{8}$	25	28 $\frac{3}{4}$	33 $\frac{3}{8}$	20 $\frac{3}{8}$	14 $\frac{1}{8}$	11 $\frac{3}{4}$	11	9 $\frac{1}{2}$	8 $\frac{1}{4}$	200 00
10	21	21	38 $\frac{1}{4}$	30 $\frac{1}{8}$	31 $\frac{5}{8}$	37 $\frac{1}{8}$	23 $\frac{1}{8}$	18 $\frac{1}{4}$	13 $\frac{3}{8}$	14 $\frac{1}{4}$	12	9 $\frac{3}{4}$	250 00
11	24 $\frac{1}{2}$	24 $\frac{1}{2}$	42 $\frac{3}{4}$	35 $\frac{3}{8}$	46 $\frac{1}{2}$	.	.	22	.	17 $\frac{1}{8}$	14	.	350 00

FIG. 328

COVER'S METAL RESPIRATOR

Especially adapted for parties who are compelled to continually inhale
poisonous dust, fumes or gases



FIG. 329

The filter arrangement is such that the air is purified while passing through a fine sponge which can be easily removed and rinsed with water when desired to clean the Respirator. The automatic valve is very simple and will always act independently of the position in which the operator is working. It is made of the best **white rubber** and will easily bend to fit any face perfectly, and is fastened to the head with an adjustable elastic band.

Price \$3.50

A good Device to be used in the Cleaning Room

“IMPERIAL,” TYPE 11 AIR COMPRESSORS

Designed For Terminal Air Pressures of 15 to 25 Pounds

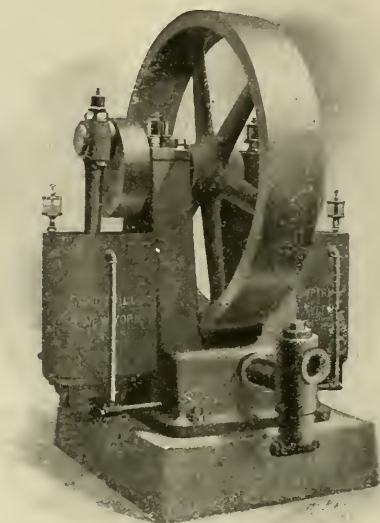


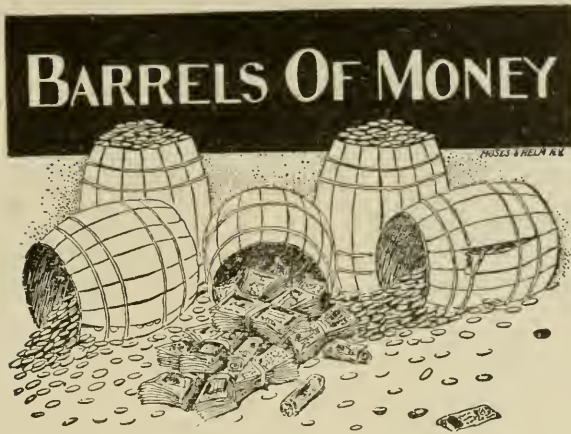
FIG. 330

Duplex, Single-Acting Air Cylinders, Belt-Driven

Size Number.	Capacity in Cubic Feet of Free Air Per Minute.	Dimensions of Air Cylinders Inches.		Revolutions Per Minute.	Cubic Feet of Free Air Per Revolution	Indicated Horse Power.	
		Diam. of Each.	Stroke.			Air Pressure Pounds.	
						15	25
1.41	88	9	6	200	.44	5	7.4
1.42	141	10	8	195	.725	8	11.8
1.43	185	11	9	190	.973	10.6	15.5
1.44	284	13	10	185	1.53	16	24
1.45	502	16	12	180	2.78	28	42
1.46	804	19	14	175	4.59	46	67

Belt Pulleys.		Diameter of Pipes Inches.			Over-all Dimensions Inches.			Shipping Weight Pounds.	Prices F. O. B. New York, Complete Compressor. *
Diam. Inches.	Face Inches.	Air.		Circulating Water.	Length	Width	Height		
		Intake	Dis-charge						
36	6 1/2	3	2 1/2	3/8	44	36	48	1650	\$ 360
36	6 1/2	3	2 1/2	1/2	46	36	50	1750	450
42	7 1/2	4	3	1/2	51	42	58	2350	600
48	8 1/2	5	3 1/2	1/2	58	48	66	3200	825
60	10 1/2	6	4	1/2	69	60	84	6000	1200
72	12 1/2	7	5	3/4	80	72	95	8600	1650

*Prices do not include unloader.



**CAN BE SAVED, AND TO SAVE MONEY IS TO
MAKE MONEY**

YOU CAN DO THIS BY USING

Power Sand Sifting Machines

**Can be used in Core Rooms for Mixing Core Sand. Also
Invaluable for Mixing the Facing Sand**

**THEY ARE MODERN AND "UP TO DATE." THEY WILL
PAY FOR THEMSELVES IN A VERY
SHORT TIME**

See following pages for description and prices.

Correspondence solicited.

PORTABLE FOUNDRY SIFTING MACHINE

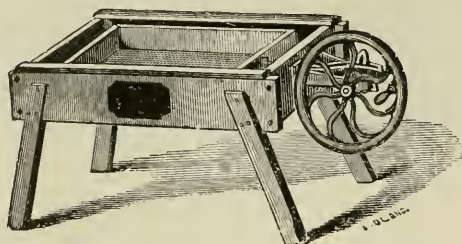


FIG. 331

Dimensions of sieve frame, 30 x 20 inches. Will save its cost in three months. Will cut your facing sand thoroughly. Six movements of sieve to each turn of wheel. If you will try one you will not be without it. This price is for one sieve; extra sieves furnished at cost. Are used by most of the large machine foundries in the country. **This has a faced pulley, so that it can be run either by power or hand.**

Price \$30.00 each.

Extra boxes complete with any size mesh . . 7.50 "

ROTARY SAND SIFTER

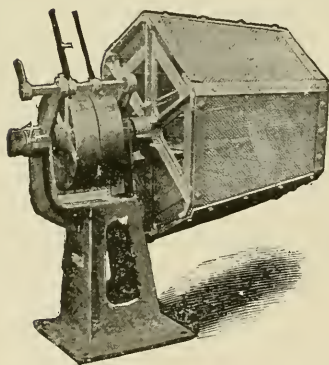


FIG. 332

This sand sifter is an improvement on our original design, which was the first rotary on the market. This machine is self-contained, the pedestal is of approved construction and of ample strength. The screen is over-hung, and tapering in such a form that the refuse is discharged and barrel is constantly kept clean. A deflected plate separates waste from sifted sand. The operation is by belt power; a shifter in connection furnishes means for starting or stopping the machine at will.

Made in two sizes.

No.	Diameter of Barrel, Large End.	Diameter of Barrel, Small End.	Length of Barrel.	Approximate Floor Space.	Capacity Per Hour Sifted Sand	Price
1	30 in.	24 in.	24 in.	2' 10" x 4' 0"	30 cu. ft.	\$104.00
2	36 "	30 "	30 "	3' 6" x 4' 9"	50 "	134.00

This machine may be made to be driven by a compound air motor or an electric motor, and made portable by mounting on wheels.

Above in stock, ready for prompt shipments.

THE HANNA PORTABLE PNEUMATIC SCREEN SHAKER



FIG. 333

Stationary Size



FIG. 334

Portable Size

We wish to call your attention to this, the latest adaptation of the portable tool principle for foundry work.

To the superintendent or manager who is responsible for the output, smooth running and successful operation of a manufacturing plant, the question of first importance is the selection of the proper men and their proper management to help carry out his work; next comes the selection or design of the proper machines and appliances for this work. In the handling of these two questions may be found the difference between success and failure in a majority of instances. In no two cases, proba-

bly, are all the conditions alike, yet in a majority of instances there are certain conditions that apply to all. In the handling of one of these almost universal conditions, namely, that of preparing molding and core sands for the molds, in shops where the work is too diversified and too uncer-

tain to allow of a central screening, mixing and tempering plant, with the necessary delivery and return elevator and conveyors, bins and chutes, was the herein described machine developed.

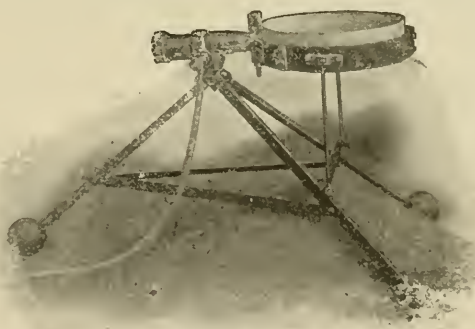


Fig. 335

Use the "Up-to-Date" Sand Sifter

Description. The Hanna Pneumatic Screen Shaker is the simplest possible arrangement of a valveless piston working in a cylinder, the piston directly attached to a holder arranged to hold the circular *foundry riddle*, the whole mounted either on tripod or on frame to be held by sockets fastened to posts or building walls. There is practically only one moving part, and no joints working under reversing strains.

Changing Screens. Screens can be changed in a *fraction of a minute*.

Capacity. Through a one-half-inch mesh riddle, the machine will shake all the sand that two men will care to shovel. Through one fourth mesh, all that one man could shovel; other sizes in proportion.

Cost of Operation. The machine will use about 12 cubic feet of free air per minute, and is designed to work at 80 pounds gauge pressure. The cost of compressing 1,000 cubic feet of free air to 80 pounds gauge pressure depends upon the compressor used, and upon the arrangements for handling and *cooling* the air before, during, and after compression. The minimum may be stated at about $1\frac{1}{2}$ cents, and the maximum may run up without any extraordinary circumstances to 6 cents, or $4\frac{3}{10}$ cents for 720 feet, the amount that the screen shaker might use in one hour. There is no reason for expecting such an expense, but we can afford to be generous in this matter, and will say that there might be a cost of $2\frac{7}{10}$ cents per hour for repairs on machine, compressor, hose, couplings, pipe line, riddles, etc., and our total operating expense for one hour would amount to 15 cents for one man and 7 cents for air and repairs—total 22 cents. What have we to show for this expenditure? As much sand as one man would have riddled by hand, or have wheeled to stationary machine in five hours. Cost of wages alone 75 cents, saving 53 cents. Can you afford to do without it?

Price, \$120 each.

Now in use in the largest foundries in the world.

Special catalogue on application.



We are acknowledged to be the leading ENGINEERS and DESIGNERS of the most Modern and "Up-to-Date" Labor Saving Devices used in the melting and handling of metals

PNEUMATIC SCREEN SHAKER

(Square Sieves)

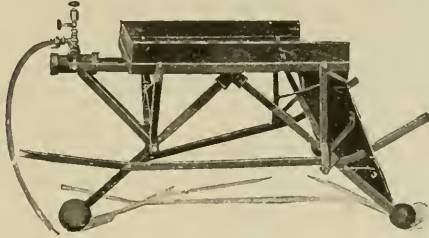


FIG. 336

This machine is built entirely of steel, strongly and substantially constructed, and is designed to be operated by compressed air or steam. You will observe that the sheet iron apron placed at the end of the screen keeps the fine sand separate from the larger particles, which are not permitted to sift through the screen. The screen is set at an angle and the bottom end is open, thus allowing the coarse material which



View Showing Sheet Iron Apron

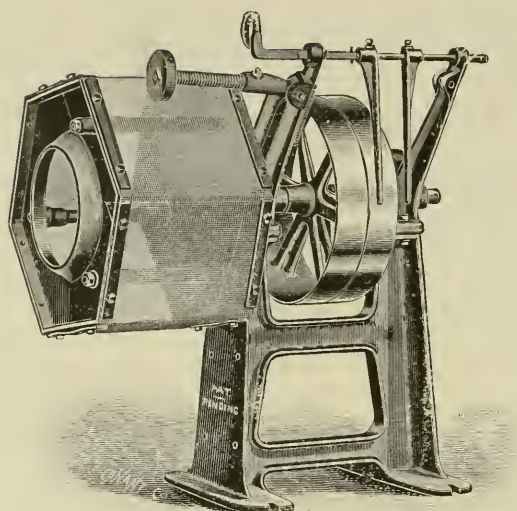
does not pass through the screen to be discharged at the bottom. The machine itself is operated by a valve-controlled double acting cylinder, giving ample power for any load that may be placed on the screen. It is intended to be handled by two men starting at the end of the sand heap, the machine being moved along and over the sand as it is shoveled into the screen and riddled through it.

3 mesh to the inch, and another with No. 2 mesh to the inch, each of which are 2 feet wide and 3 feet long. These screens are interchangeable and can be taken out and replaced by simply removing one nut. Floor space required 3 feet by 5 feet. When placing order specify whether to be operated by compressed air or steam. Approximate weight 175 pounds.

We furnish with this Pneumatic Screen Shaker one screen with No.

List price, \$200.00

Correspondence solicited. Write for discount.



**THE OBERMAYER
IMPROVED
AUTOMATIC
SAND
SIFTER**

FIG 337

Is strong, rigid and well made. Bearings are long, and large automatic oil cups keep them well lubricated. The entire machine is made of cast and wrought iron and steel, and will do good justice to the proverbial three score and ten years. The wire netting which encircles the hexagonal receiving drum is especially heavily woven and can readily be taken off or replaced. This netting is furnished in different widths of mesh for various classes of work, and you should state *in your order* which *size mesh* you desire. A long steel brush striking against the side of the drum as it revolves, prevents the clogging up of the screens with sand. Three heavy iron bars running through the drum break up the lumps of sand and a circular projecting rim prevents the gravel from being thrown out and mixing with the sifted sand.

About one-quarter to one-half horse power is required to run one machine, the drum revolving about 36 revolutions per minute. The tight and loose pulleys are 24 x 4 inch face.

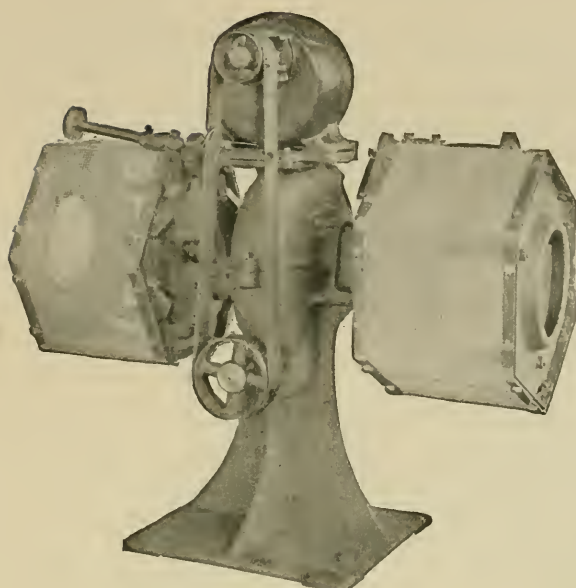
With one machine one man sifts about sixty tons a day, but this is not the limit, for it will sift just as much as can be fed into it.

As there is no delicate mechanism in its construction, no restriction is placed on the quality of sand used. The fact that nails and stones may be in the sand does not impair the working of the machine in the least.

The floor space required for the single machine is 30 x 52 inches.

Price, \$125.00

This Machine can be Furnished with Double Screens at Extra Cost



THE OBERMAYER SAND SIFTING MACHINE

Motor Driven

**Furnished With or
Without Electric
or Compressed
Air Motor**

**Made Single or Double
End**

FIG. 338

The Obermayer patent motor driven machine was designed for shops having electric or compressed air motive power. It is operated through worm and worm wheel, which are enclosed in dust proof casing, and all parts are substantial in construction and built for wear.

The motor is placed on top of machine, and is belted direct to pulley on worm shaft as shown, making a very compact arrangement. An advantageous feature is that any kind or style of motor can be used. Machines can be furnished with or without motor, as may be desired.

The Obermayer Patent Sand Sifter and Mixer (Motor Driven)

SIZE.	WITH MOTOR.			WITHOUT BUT READY FOR MOTOR.		WITH OR WITHOUT MOTOR.	
	Electric.	Net and Gross Weights (about) Lbs.	Floor Space (about)	Net and Gross Weights (about) Lbs.	Floor Space (about)	Cubic Feet (about)	R. P. M. of Worm Shaft.
Single End.	115 Volt 220 "	1,160 1,450	34x52 in.	950 1,220	30x52 in.	60	900
Double End.	115 Volt 220 "	1,440 1,900	34x70 in.	1,200 1,680	30x70 in.		

NOTE.—When ordering machines with electric motor state voltage and whether direct or alternating current; when with compressed air motor state pounds pressure.

Prices on application.

DISINTEGRATER AND SAND PULVERIZER

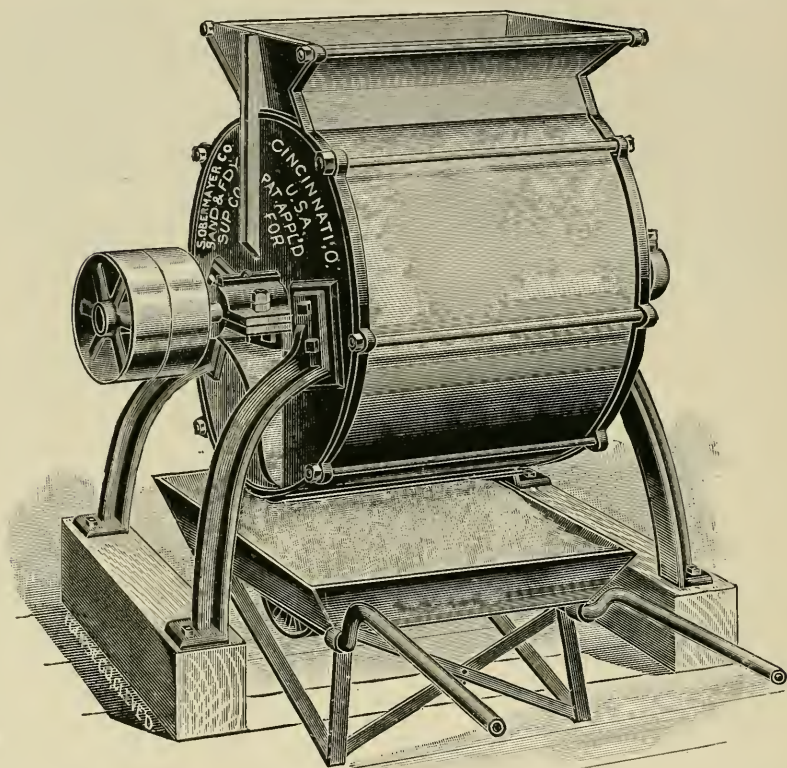


FIG. 339

This machine will more thoroughly pulverize lumpy sand and old cores than any other machine made. It makes good sand out of poor sand and saves the waste of lumpy sand and old cores in screening. It requires less than one half the power and about one half the speed that is required for a Centrifugal Machine. This machine is built strong to stand hard usage and the cost to keep in repair amounts to mere nothing, as there are no parts of the machine to get out of repair. This machine will please any Foundryman who is in need of such a machine. It will work well in connection with our Mixer, set under the rear end of the screen to catch and pulverize the lumps that pass over the screen, thereby saving the waste of sand and at the same time increasing the output of the Mixer. It will not clog up. Capacity all that two men will shovel in the hopper.

Dimensions and Price

Floor Space.	Height Over All.	Drive Pulley T & L.	Speed.	Horsepower.	Price.
24 x 34 ins.	38 in.	8 x 3 in.	400 to 500 revs. per. m.	2 to 3	\$300.00

STANDARD FOUNDRY SCREEN

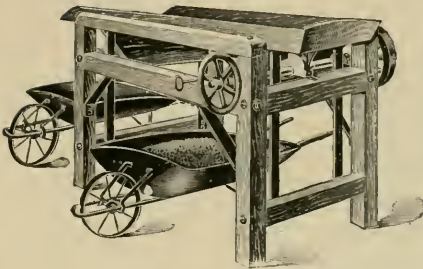


FIG. 340

An "up-to-date" foundry Screen. For any kind of separating it has more capacity than any screen made and runs with less power. Cam motion. Portable mounted on wheels with or without direct Motor attachment.

Price, power T. & L. Pulley, \$150.00

Price, with Motor Attach't, 250.00

BALL-BEARING CENTRIFUGAL SAND MIXER

This Machine consists of a rapid revolving steel disk 27 inches in diameter, having on its top sixty $5 \times \frac{5}{8}$ in. steel pins. The sand is fed into the hopper, from which it falls on the disk and is then thrown by centrifugal force against the pins and out against the inside of the cover or hood, and comes out in a fine shower, free from lumps.

The upright shaft is $2 \frac{3}{16}$ in. with 8 in. babbitted bearings provided with large ball bearings all up and above the sand, which prevents cutting out the babbitt metal.

There is a door in top of the hood for cleaning out stones and trash that become clogged in the pins. The machine should be boarded up inside of the legs on two or three sides to prevent material from spreading.

This machine is just the thing to work up your old Cores with, or cut up and make good Sand out of any old stuff.

If you are interested, ask for catalogue.

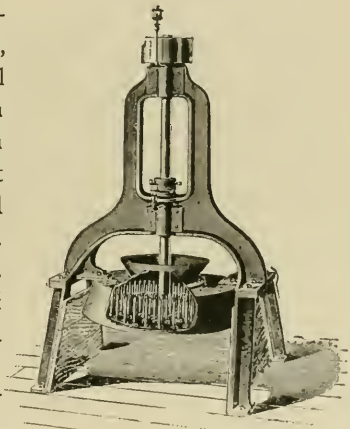


FIG. 341

Dimensions and Prices

Floor Space.	Height.	Size of Pulley.	Weight About	Speed.	Price
3 ft. 2 in.	7 ft. 4 in.	12 x 6 in.	1200 pounds	800 revs. per minute	\$300.00
4 " 6 "					

Top of hopper from floor 3 feet, clearance under hood 21 inches, capacity 8 to 10 tons per hour, 4 to 5 horsepower.

Correspondence solicited.

CENTRIFUGAL SAND MIXING MACHINE



FIG. 342

This machine will disintegrate lumpy sand and will thoroughly and evenly mix all kinds of molding sand, core sand and foundry mixtures. It will do the work quickly and economically.

It consists of a rapidly revolving table, having on its top surface a number of prongs projecting upward. The sand is fed into the hopper at the top of the machine from which it falls upon the revolving table, and is then thrown by centrifugal force from prong to prong, and out against the inside of the cover or hood. It emerges from beneath the hood in a fine shower, free from lumps and thoroughly mixed. The table spindle, spindle pulley, and bearings are enclosed in the housing or base upon which the machine stands, so as to effectually protect these parts from sand and dirt. A removable door or cover is placed at the front of the housing, to afford access to the spindle and bearings, for cleaning or lubrication. The hopper is hinged, for convenience of cleaning the prongs and removing stones, nails, etc., which do not pass between them. The machine is not intended to screen the sand of such pieces, and sand that contains stones and bits of iron should be first passed through a coarse screen, to remove these foreign substances.

The machine shown in the cut is arranged to be driven by belt, over carrier pulleys at the back of the housing to the pulley on the table spindle referred to above. We also build the machine driven by a **special electric motor** carried in the housing.

The machine will mix sand as fast as two men can shovel it into the hopper, or at the rate of about five tons per hour. The great saving in labor and time effected by the use of our Sand Mixer will very soon pay for the machine, while its use insures far better results from the sand than can be obtained from any other process.

Prices on application.

BELT POWER RIDDLING MACHINE

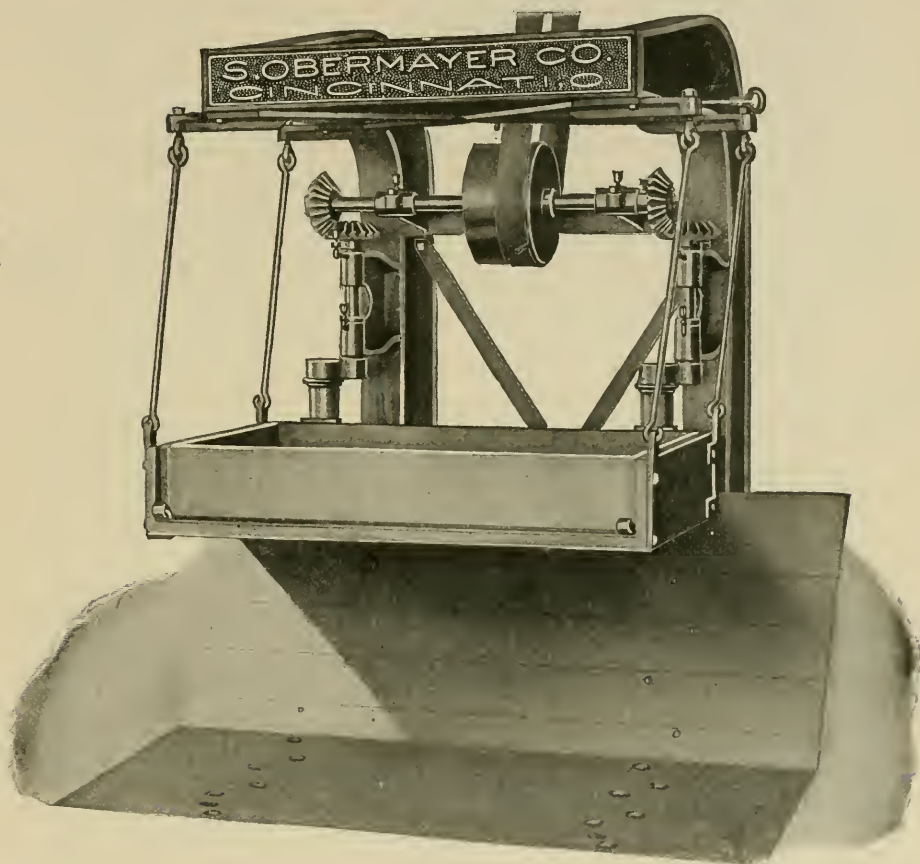


FIG. 343

It is designed for shops having a large amount of sand to be riddled which can be done at a fixed location where power can be applied. The frame is iron, well braced in all directions so that the machine is perfectly rigid in motion. The cranks are connected with the rear corners of the riddle frames, leaving the front and sides unobstructed. All bearings are protected from dust and dirt, thus preventing undue wear. Weight, 1,350 pounds, occupies a space 5x6 feet and 6 feet high; riddle surface 24 x 44 inches, riddle boxes 6 inches deep, pulleys 4 x 12 inches. The shifting device for starting and stopping the machine can be operated from either side. The capacity of this machine is from five to fifteen tons per hour, according to the size of riddle used and the character of sand riddled. We furnish with each machine three riddle boxes of different size mesh wire. Additional boxes will be furnished if desired. The riddle boxes are operated by two cranks and are so connected as to be out of the way when feeding the machine. The riddle boxes are held in place by lugs which permit them to be lifted out to dump the riddlings or change the boxes, which change requires but a minute. All parts are interchangeable and can be easily repaired. When the wire is worn it is a very easy matter to replace it.

Price, f. o. b. factory, belt feed	\$150.00
Equipped with Electric Motor	240.00

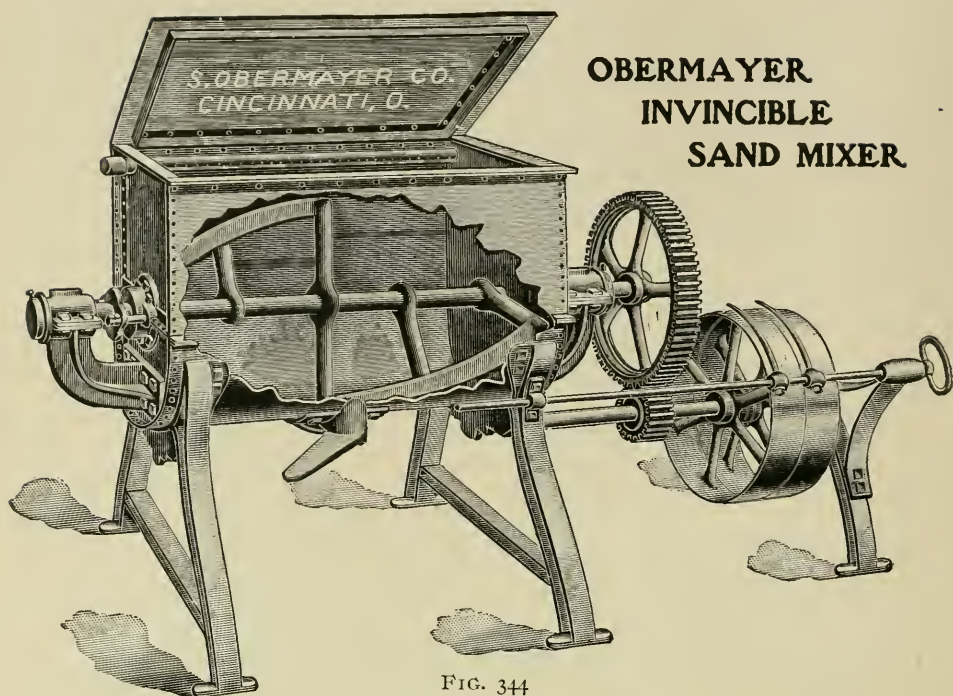


FIG. 344

Designed for Foundry Use, to Insure Thorough Mixing of Facing and Core Sand

Nothing is of greater importance to the foundryman than a thorough, reliable blending of the sand he uses. This is particularly true of core and facing sand, for the reason that when the ingredients are not thoroughly mixed imperfect castings will naturally result.

The Invincible Sand Mixer has been so constructed that the most perfect blending is accomplished, the movement of the agitator or mixing blade being such that every particle of the sand is in a constant state of agitation, thus insuring the most thorough intermixing. A great deal of work can be done by this machine in a short time without employing skilled workmen at high wages. A boy can accomplish the same good results with our machine as a man.

Instead of the sand being discharged as fast as it is mixed, as is the case with other mixers, this device retains the mixture until it is properly tempered, a sprinkling attachment being one of its important features.

The fact is generally recognized by foundrymen that an excessive quantity of any of the ingredients comprising the core mixture does not produce as satisfactory results as a properly mixed core sand would yield. There are ingredients in the binder for core sand that will produce a gas when brought in contact with the molten iron, and if this gas is not permitted to escape through proper vents, flaws will appear in the castings. In the facing sand also proper mixing and tempering is necessary to prevent scarred castings—scabs, cuts, etc., which mar the surfaces and cause extra labor and expense.

All these deficiencies are fully obviated by the thorough work performed by the Invincible Mixer. The machine is made with heavy boiler steel tank and wrought iron mixing-blade. Stuffing boxes are placed on the mixer shaft, at the ends of the tank, thus protecting the bearings from the admission of sand and grit. The discharge opening is in the center of the tank bottom at a sufficient height from the floor to admit of a wheel-barrow being placed under it to receive the sand as it is required. This arrangement obviates rehandling, and the unused portion of the mixture may be left in the tank, where it will be well protected from foreign substances.

Made in five sizes. Capacities one, two, three, four and five barrels each.

Two standard sizes kept in stock.

Further particulars and prices upon application.

OBERMAYER STOVE PLATE CASTING GRINDER

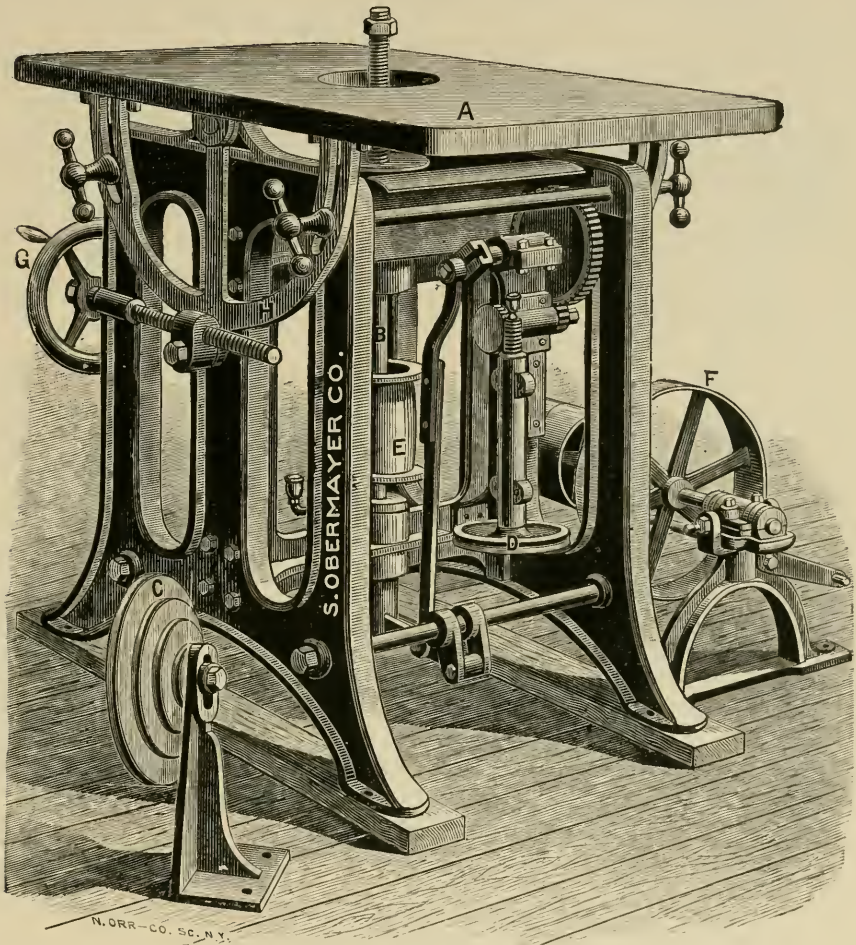


FIG. 345

This machine is designed so that table (A) can be adjusted to any desired angle. The spindle can be adjusted by use of cross pulley furnished. The adjustable table measures 24 x 24. Some of our customers use cone-shaped wheels successfully on these machines.

Weight, 800 pounds; height over all, 39½ inches; floor space, 23 x 41 inches; size of tight and loose pulleys on countershaft, 6 x 3½ inches.

Price, complete with countershaft \$350.00

We recommend wheels about 8 x 4 inches and furnish them at extra cost.



TO SHOW YOU

MOLDING MACHINES

**All Kinds and All Makes for Every Purpose. We Have
the Ordinary MOLDING PRESS WHICH PRESSES
THE SAND INTO THE FLASKS**

ALSO

**The Molding Machine with Draw Plate Pattern
The Molding Machine to Make Pulleys
The Molding Machine to Make Brake Shoes**

IT will be to your interest to correspond with us should you be in the market for a Molding Machine. We can save you money and at the same time furnish you with the machine most suitable for your purpose.

See following pages for cuts and description.

PRIDMORE SAND MOLDING MACHINES

Draw Pattern Types

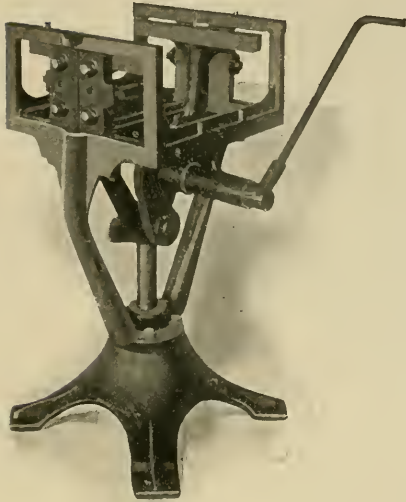


FIG. 346

The Pridmore Molding Machines in construction are most simple and substantial, consisting mainly of two castings, a strong stiff frame which stands on the floor and which carries the stripping plate, and a yoke to which the patterns are attached. They are fitted with appliances for shortening or lengthening the draw, for adjusting the patterns to their proper height relative to the stripping plate and for taking up wear on the ways and crank pins, and all wearing parts are brass bushed. All machines of the same size are perfectly interchangeable, both as to the different parts used in their construction and also the fitting of patterns.

Figure 346 shows the square stand type which is made in seven different sizes, ranging in width from 9 to 18 inches.

To make a mold on the Pridmore Machine, but two operations are necessary, namely: 1st. Shovel the sand into the flask and ram it up. 2d. Drop the lever which draws the pattern. The ramming is done by hand, which method many years of experience on all classes of work has clearly demonstrated to be superior to all others, both for speed and quality of castings. It permits the construction of a portable machine, the advantages of which are explained in detail in our molding machine catalogue. The smaller sizes are moved forward by the operators as the sand and flasks are used up, while on the larger machines quick, easy moving traveling cranes are used which serve to lift the large, heavy flasks as well as the machine. These cranes are also useful when shaking out.

Figure 347 shows the round stand type, which is made in six different sizes, ranging from 10 to 20 inches in diameter. The stand machines have a maximum draw of $4\frac{3}{8}$ inches.

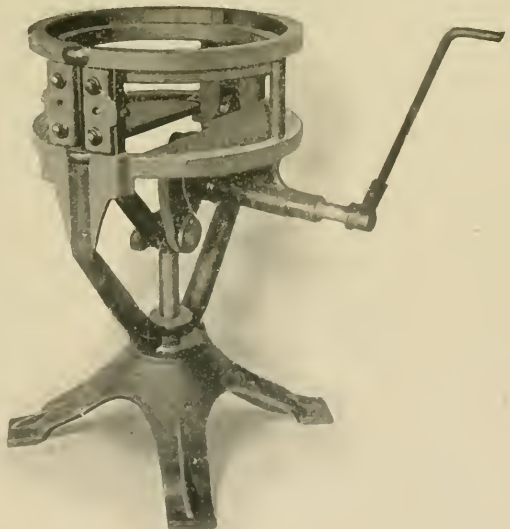


FIG. 347

PRIDMORE SAND MOLDING MACHINES

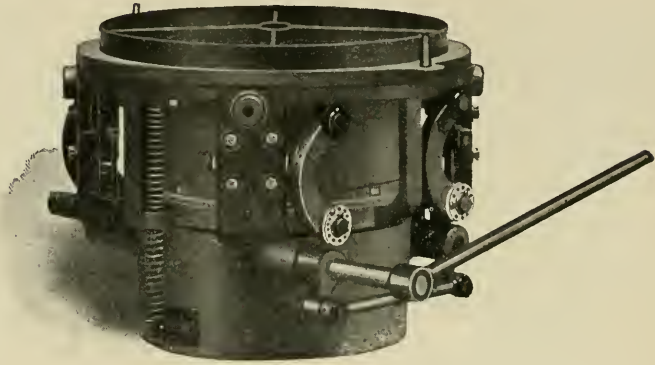


FIG. 348

Figure 348 shows the round, heavy, double shaft type which is made in 46 regular sizes, ranging in diameter from 18 to 60 inches. Square Machines of this same type are made in 259 regular sizes, ranging in width from 10 to 52 inches; and in length from 15 to 54 inches. The smaller and medium sizes of these heavy double Shaft Machines are made with draws of 6 inches, 8 inches and 10 inches; some of the largest sizes have draws of 12 inches and 14 inches.

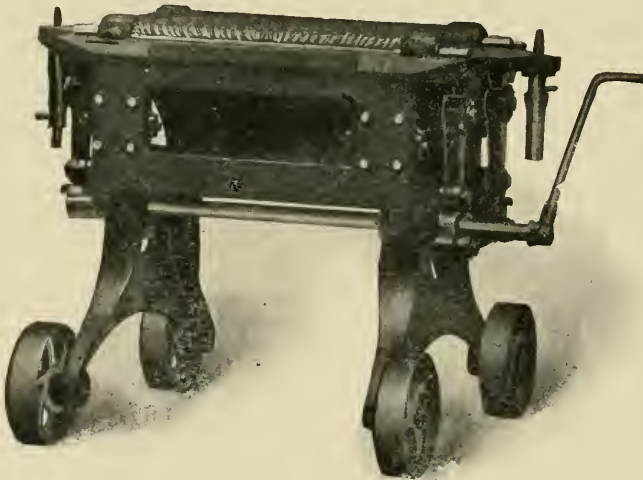


FIG. 349

Figure 349, shows a light, double shaft machine, fitted with a radiator pattern. This type of machine is made in 39 regular sizes, ranging in width from 9 to 20 inches and in length from 18 to 48 inches. They have a maximum draw of $4\frac{3}{4}$ inches.

PRIDMORE SAND MOLDING MACHINES

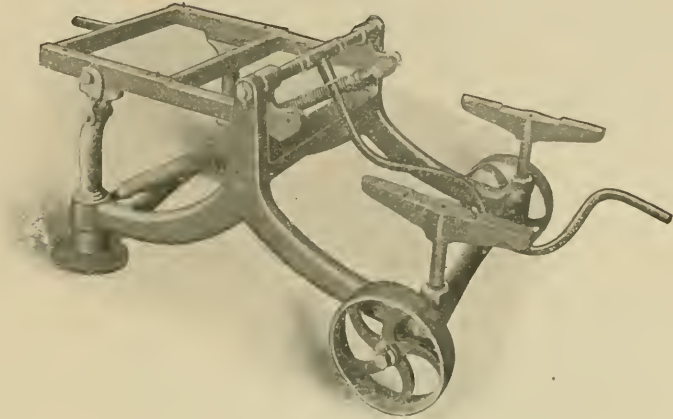


FIG. 350

Figure 350 shows a Rockover Machine, which is made in two styles, namely: Single Stand and Double Stand. These machines are used for the production of castings of medium sizes, having deep pockets, which in the mold, form hanging portions of sand.

Pridmore Machines may be fitted with either wooden or metal patterns and plates, depending mainly upon the number of castings required. When a great number of duplicates are to be made, iron patterns and plates will give the best service; when only a few castings are needed, very satisfactory results are obtained from wooden patterns and plates, which is a very inexpensive method of fitting up the machine. There are a number of shops in which these machines are being used, fitted with wooden patterns and plates for making as few as five or ten castings from one pattern. A full description is given of both methods on pages 54, 55 and 56 in our Molding Machine Catalogue. Sent for the asking.

The use of wooden flasks on these machines is not recommended; ordinary iron flasks, the same as employed in hand ramming, are all that is required. From wood and metal snap flasks used with the machines, equally as satisfactory results are obtained as on hand molding, and by dropping wrought iron bands in the flasks and ramming them up in the mold, patterns larger than those usually molded in snap flasks can be used.

There are over four hundred and fifty regular sizes in which these machines are being made and eighteen different types, five of the most popular of which are illustrated here.

A complete catalogue of these machines, which contains a very full description of their construction and method of operation, and other useful information, such as method of determining what sizes are required, advantages of the stripping plate, hand ramming type of machines, etc., will be furnished promptly upon application.

THE FARWELL UNIVERSAL MOLDING MACHINE

30 Inch Stationary

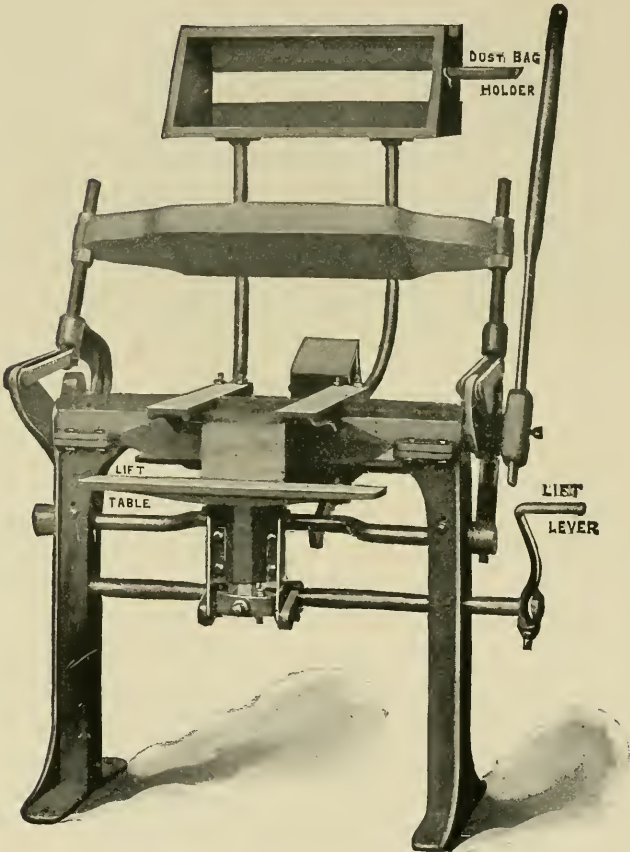


FIG. 351

Patented December 21, 1897, and November 22, 1898.

General Dimensions

Weight, 400 lbs.

Extreme width of machine	40	inches
Distance between side rods	30	"
Width of table	18½	"
Lever adjustable from	20 to 40	"
From table to presser top adjustable from	5 to 16	"
Adapted for flasks up to, in length	24	"
Adapted for flasks up to, in width	18	"
Adapted for flasks up to, in depth	10	"
Height of table from floor	30	"

THE FARWELL UNIVERSAL MOLDING MACHINE

This is a molding press with a lifting mechanism located below the stationary press table, and operated by the lever at the left.

This machine may be used in the following forms :

As a Combined Molding Press and Stripping Plate Machine.

As a Combined Molding Press and Flask Lifter, without stripping plate. (Means are provided for rapping the patterns.)

As a Plain Molding Press.

This is the Simplest Mechanism Ever Devised for This Purpose.

The Lift Lever is convenient and easily operated.

The Lift Table is Guided in its vertical movement by a single long hexagon slide, which is protected from the sand and is adjustable to take up wear.

The Lift Table Does Not Support the Patterns when the mold is being pressed, but lifts the mold and stripping plate off the patterns after it is pressed.

Patterns Can Not Spring under pressure, as they rest firmly on the stationary press table.

Can Not Be Clogged or in any way injured by sand.

Can Not Be Thrown Out of Adjustment carelessly or maliciously.

No Oil Need Be Used. Sliding parts have antifriction metal bearings protected from the sand.

Essential Parts Finished to Template. Patterns fitted to one of these machines will fit any other one of them.

One Size Machine is Adapted for any Size or Shape of Mold, either single or duplex, containing not more than four hundred square inches of surface.

Either Iron Flasks or Snap Flasks May Be Used with this machine.

To Change From One Job to Another of any size, it is simply necessary to lift off one plate and pattern and replace with another.

No Re-Adjustment of Machine.

Several Jobs May Be Run on the Same Machine in a Day without waste of time in adjustment.

Stationary Base for Brass and Malleable Iron Foundries is furnished with this machine if desired.

Combined Molding Press and Stripping Plate machines have been objectionable because the patterns which are usually supported by a toggle joint would spring under pressure. In the Farwell Universal Molding Machine this objection is removed. At the time the patterns and plates are subjected to a strain in pressing the mold the pattern plate and stripping plate rest firmly upon the stationary press table and can not spring.

THE FARWELL MOLDING PRESS

30 Inch Portable

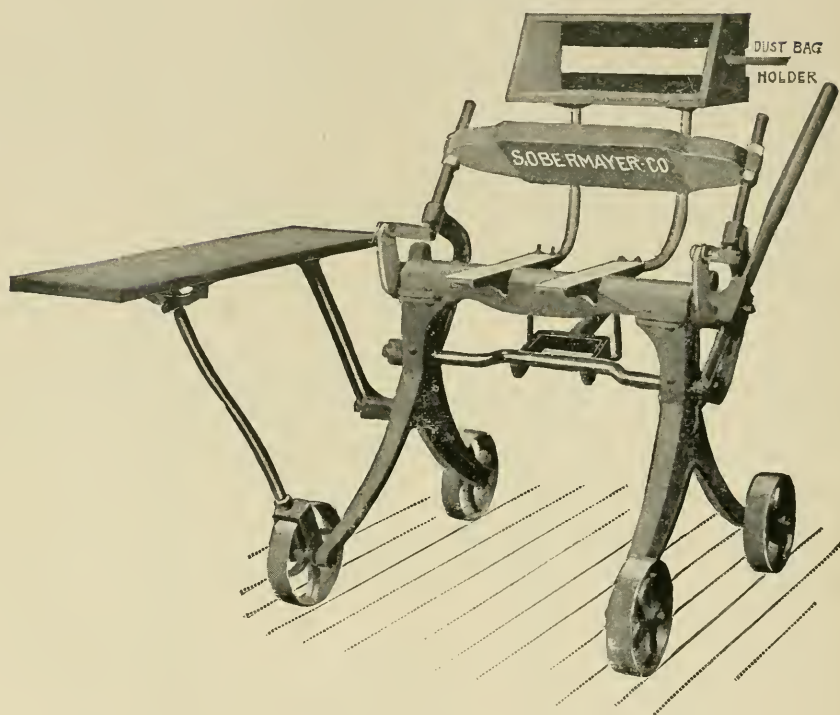


FIG. 352

Patented December 21, 1897, and November 23, 1898.

Plain Top With Side Shelf (Size 12 Inches by 3½ Feet)

General Dimensions

Weight, 425 lbs.

Extreme width of machine	43	inches
Length between side rods	30	"
Width of table	18½	"
Length of lever adjustable from	20 to 40	"
From top of table to presser top at lowest adjustment	5	"
From top of table to presser top at highest adjustment	16	"
Adapted to press flasks up to and including in length	24	"
Adapted to press flasks up to and including in width	18	"
Adapted to press flasks up to and including in depth	10	"
Height of table from floor	either 28, 30 or 32	"

Write for Special Catalogue

THE FARWELL MOLDING PRESS

Stationary and Portable

The Rocker Shaft Bearings are Turned and oscillate in long bearings protected from the sand.

The Table and Presser Head are planed true.

Steel is Used for Draw Bars, Pitmans and Pins that are subjected to strain when pressing the mold.

The Side Rods are Connected to each other at the bottom by a shaft and at the top by the presser head so the presser head will not get twisted should the adjusting nuts loosen.

All Working Parts are Above the Sand and are not subjected to the wear other machines receive.

It is More Quickly Operated Than Any Other Press. One motion brings the top in position and presses the mold.

The Lever is in a Horizontal Position When Pressing the Mold, where it receives the greatest power with the least exertion on the part of the operator. Presses with vertical levers strain the arm and chest muscles of the operator.

The Lever is Adjustable to conform to the size of the mold, and the weight of the operator. A large mold is pressed as easily as a small one.

It is By Far the Most Powerful Press Made. Molds as large as 18 x 22 or 16 x 24 inches can be pressed with ease. Ratio of leverage 30 to 1 with full length of lever.

Less Skill is Required to Operate It. When the lever is properly set, every mold receives the required pressure without judgment or care on the part of the operator, who simply leans his weight upon the lever.

The Portable Machine is mounted on wheels and is adapted to pass to the left of the sand heap.

The Sand Heap should be cut in a long row lengthwise the floor to the right.

The Bottom Boards should be stacked in a row to the left.

The Machine is Operated between the sand and boards, and is moved along the floor from time to time as the sand and boards are used up, and the floor is filled with molds.

The Sand and Boards Are Always Convenient.

The Finished Mold is placed upon the floor just back of the operator, instead of being carried the entire length of a long floor, as is necessary with Stationary Machines.

The Molds are Dumped, after being poured, right where they lay, in a long heap where the castings are more easily picked out and the sand is in better shape to temper and cut over.

This machine not only enables a man to **Make More Molds**, but enables him to **Take Care** of more molds with less hard work.

This is the style of molding press we recommend, where the floors are over twenty feet long and the entire day's work is molded before pouring off, as is customary in gray iron foundries.

A Convenient Double Shelf forms part of this machine.

A Long Slide Shelf is furnished with all single lever portable machines and presses.

It would be as reasonable to expect a single size and style of machine tool to do all classes of work in the machine shop, as to expect a single style of molding machine to do all classes of molding in the foundry.

PULLEY MOLDING MACHINE

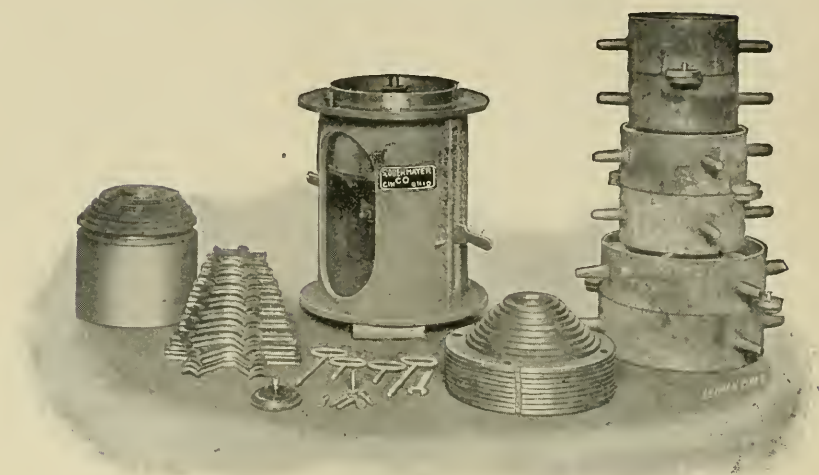


FIG. 353

No. 1 Machine Molds Pulleys From 6 Inches to 15½ Inches Diameter

A Few Points Worthy of Consideration.

These machines are designed to overcome the difficulties of molding pulleys from ordinary patterns. The two most common kinds of pulley patterns are the straight draw rim with whole arms separate from the rim, and the pattern in halves split through the center of the arms with draft both ways from the center. With the first of these the pulley castings can be made any desired width greater than width of pattern, by drawing the pattern up in the sand, or it can be made of the same width as pattern, but can not be made narrower without much trouble.

The method, however, of molding pulleys in this manner—involving as it does the use of a three-parted mold and anchor plates for lifting the center above the arms—is too expensive for the smaller sizes, and an excessive amount of drawing produces a casting which is anything but true.

The second method, where the pattern is made in halves, split through center of arms, will produce a good casting—if made in an iron flask—but will only make a casting of the width of pattern, without sacrificing the quality of the casting. Now, as there is an average of twenty widths required for each diameter of pulley, and as from 6 inch to 24 inch diameter inclusive by inches takes nineteen patterns with only one width of face, it would require the enormous number of *three hundred and eighty* patterns to make the ordinary range of work within those sizes, which is, of course, out of the question.

With the molding machines only the nineteen patterns are required, and the faces can be made from one inch up to the maximum by any variation desired. The edges of rim are exactly parallel with each other, requiring only a touch with tool to finish. The faces are so true that for rough work they can be run without turning. There is no rapping required in drawing the patterns, and as they are made with a heavy flange on one edge they will not get out of shape, but will remain perfectly round. By having three or four weights of arm patterns for the different faces there

PULLEY MOLDING MACHINES

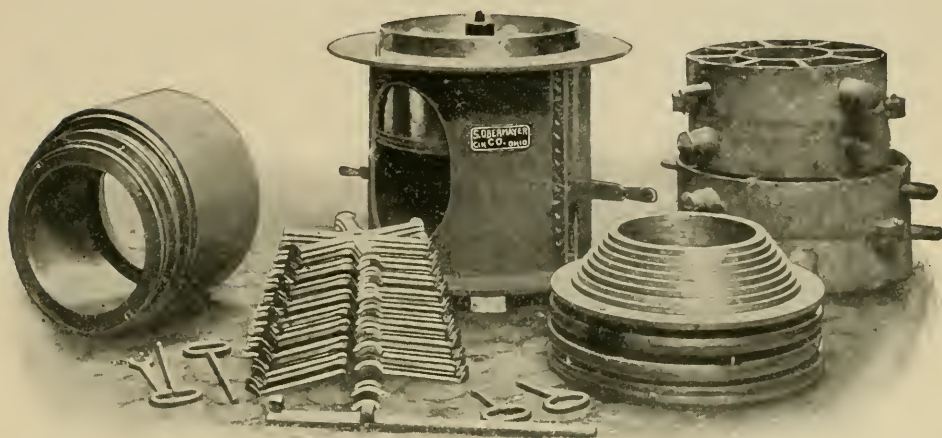


FIG. 354

is no trouble in getting just the proportion wanted. For the smaller sizes snap flasks can be used, having one flask and a large number of plain rings. The rim pattern can be used as pattern in making flasks—each machine furnishing outside rims for all its own flasks except the largest one.

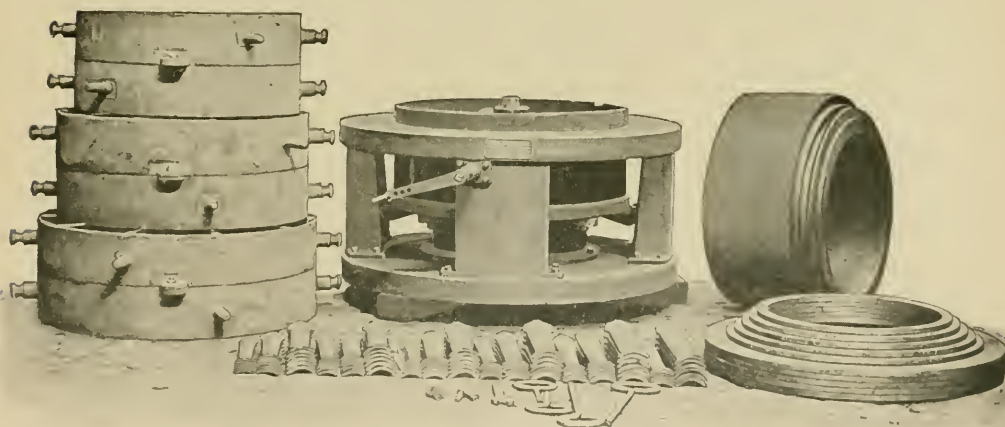


FIG. 355

Standard Machines range as follows:

No. 1	molds pulleys from	6 inches to 15 inches diameter.
" 2	"	16 " 24 " "
" 3	"	25 " 36 " "
" 4	"	37 " 48 " "
Larger Pulley Machines made up to 72 inches diameter.		

Special catalogue and lists of users supplied.

Prices and Particulars Furnished on Application

BRYAN VACUUM MOLDING MACHINE

Made in Five Different Styles

The **Bryan Vacuum Molding Machine** is the invention of a practical mechanic, who for twenty-five years has been in active business as superintendent of some of the largest machine shops and foundries in the country. His constant effort has been to improve the quality and reduce the cost of castings, and his inability to find a machine that would meet his requirements led to his inventing this one, which we do not hesitate to call the most economical one on the market. Figure 356 shows the machine ready for operation.

Although the **Bryan Vacuum Molding Machine** has been before the public for a short time only, it has been in successful operation in all the foundries of the International Steam Pump Company for upwards of two years, and with them two laborers on one machine have been doing the work of five molders.

The process of casting may be divided into five operations:

FIRST. Making the pattern.

SECOND. Filling and ramming the sand.

THIRD. Drawing the pattern.

FOURTH. Patching the mold.

FIFTH. Pouring the metal.

This machine makes the use of wooden patterns possible, and so saves the cost of metal

ones. The only expense of fitting up patterns is that they have to be attached to boards doweled to fit flasks, unless they have flat sides large

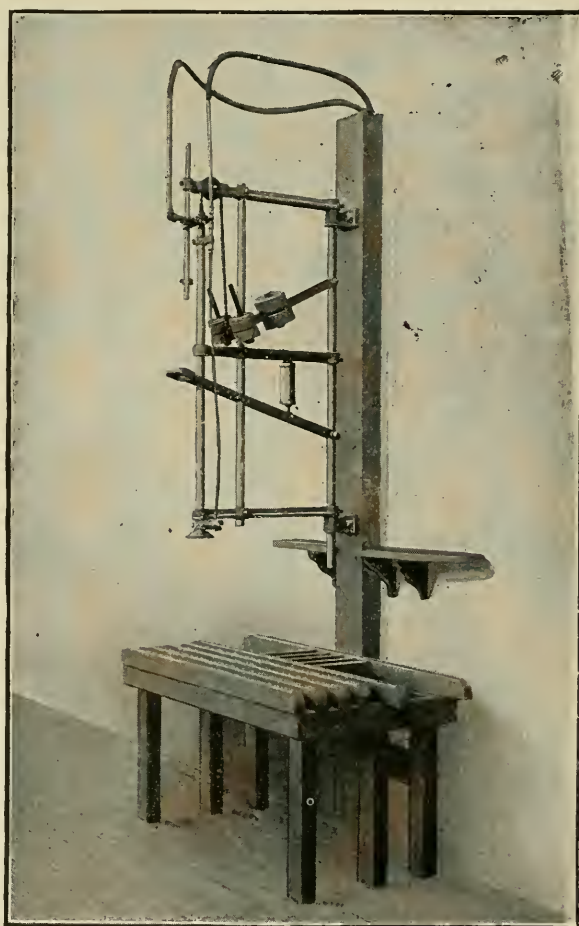


FIG. 356

enough for the suction head to take hold of, in which case no board is required.

Although a squeezer can be used in connection with it, none has been incorporated in the machine, as it would unnecessarily increase the cost. As the machine draws deep or difficult patterns almost as quickly as shallow ones, time is saved in drawing.

Figure 357 shows two men at work operating the machine, and it can readily be seen that it requires a less number of men to do the work successfully with this machine than in any other way.

All working parts are simple, and as there are no repairs required, the saving of time and results secured will justify the investment.

The suction head being attached to a rod running in guides, the lift is in an absolutely straight line, which insures a clean draw, and the pattern is lifted, instead of lowered, as in other machines.

The saving in pouring is the difference in wages between molders and laborers.

The machine can be used to lift core boxes off of cores.

As it is not confined to any one size or style of flask, it is the most universal machine on the market.

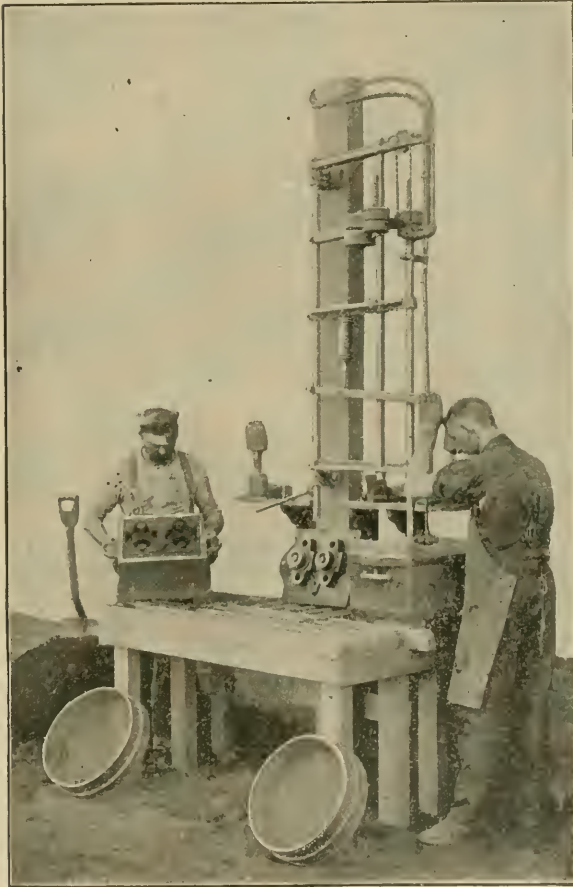


FIG. 357

The pattern boards being loose from the machine, no time is lost in changing patterns.

There being no complicated mechanism, it will run for years without any repairs, and all working parts being out of the way of sand, there is no chance of clogging.

They are built in five different sizes. Write for special catalogue and prices.

ARRANGEMENT FOR A MOLDING BENCH

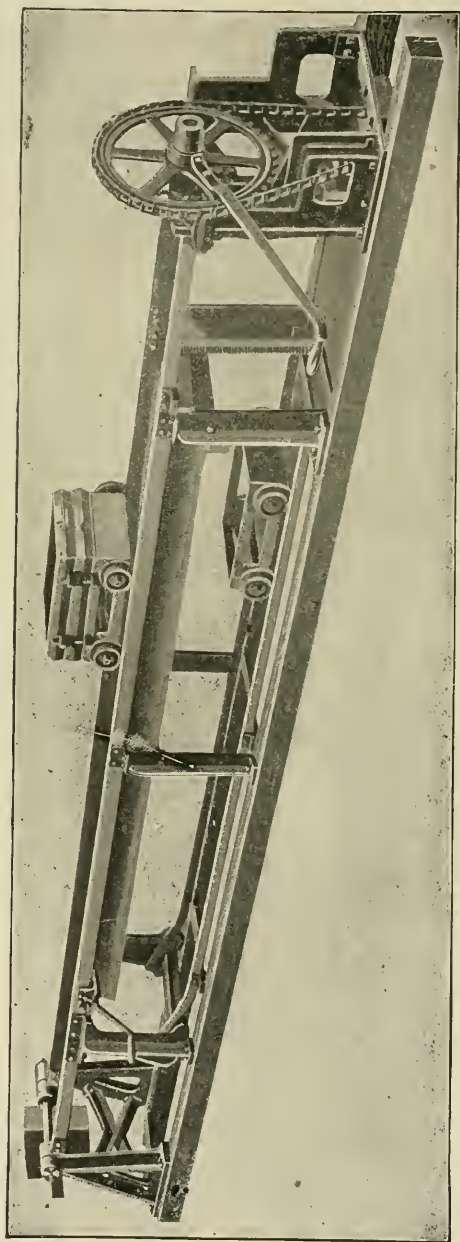


FIG. 358

The Expert Man Does the Skilled Work ; the Unskilled Man Does the Manual Work

This arrangement is designed for use in foundries where Hardware Specialties, Stove Castings, Grey Iron or Light Work are made on a medium or large scale. It is particularly adapted in places making the above classes of work. This machine by actual experience has given excellent results, and being practical in its employment the records show that a crew of six men can produce more work at a less cost than by any other method. You will observe that it specializes each man's operation, thus gaining a proficiency which otherwise can be secured only by years of hard work. One man cleans the pattern and places the flask in position; one man shovels the sand into the mold; one man rams the mold; one cuts the gate and draws the pattern. One man flours the mold, sets the cores and finally closes the mold.

MOLDING BENCH



FIG. 359

This device will reduce the cost of making your castings to a minimum, and correspondingly increases your profit. The machine is 18 ft. long and is designed for a flask, 13 x 18 in. or smaller. It consists of two tracks, one above the other. The patterns and flasks are, during the molding operation, mounted on cars which are pushed along the upper track from one operation to another, until finally the rammed mold is lifted from the car and the pattern drawn. By turning a lever the car with the pattern is automatically returned on the lower track to the first end of the bench, where it is elevated to the upper track level ready for a new mold. The machine can be used equally well with plated, gated or even single patterns and with iron or snap flasks.

This machine is not an experiment. The quality of castings produced from good molds are better and the loss of molds is less. The machine in itself is strong and durable, practically indestructible, with nothing to get out of order. It is a simple and practical solution of obtaining cheap but good castings.

We manufacture a simple device which is used as a sand mixer, as shown in figure 359, in connection with this molding machine, and we can give you figures with this standard machine or any other equipment which will effect large savings in labor and handling of your metals. Our Engineers have made the planning and designing of foundries a special study, and thoroughly understand all the methods and requirements of foundry practice. As Architects and Foundry Engineers we shall be pleased to furnish you reliable estimates for all kinds of work in our line, and respectfully solicit further correspondence.

THE ROWLAND MOLDING PRESS

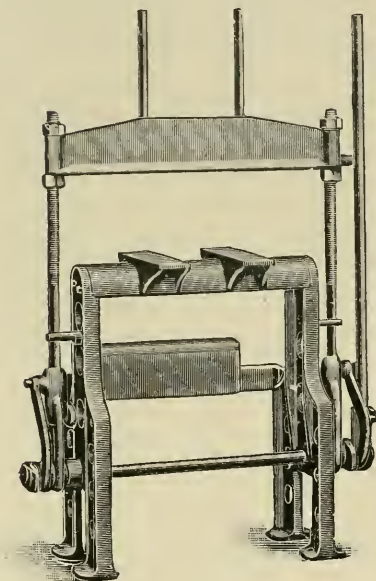


FIG. 360

Patent Applied For.

This Press is substantial, powerful and easy to operate. It is so balanced that it is impossible to jar the machine when in operation. Owing to its compact design it may be operated very close to a wall.

The regular size of press will take a flask 12 in. $\times$ 24 in. but larger sizes are made to order.

For special large work too heavy for one man to handle we build a machine with two pressing levers.

Price of Standard Size, \$50.00 each

Liberal Discount in Quantities

These machines kept in stock and can be shipped promptly on receipt of order.

O'S MOLDERS SPONGE

The illustration shows the design used by Molders for bench work, which, being conical in shape, delivers a fine stream of water, thus avoiding a great deal of trouble usually experienced with the ordinary sponge. They fill a long-felt want and are in great demand. There are two sizes made, one for bench work and the other for floor work, packed in cases of fifty each.

Prices, \$7.00 and \$10.00 Per Case

Liberal discount to consumers. Give them a trial and you will like them.

Single Sponge (small size) 25 cents each.

Single Sponge (large size) 30 cents each.

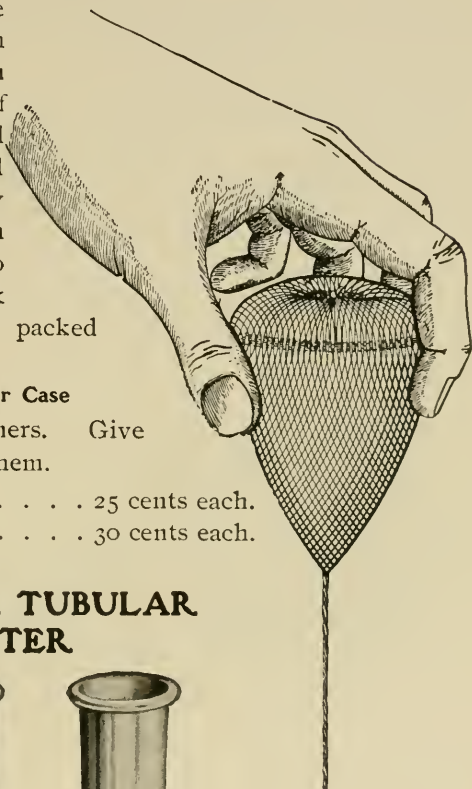


FIG. 361

THE OBERMAYER TUBULAR GATE CUTTER

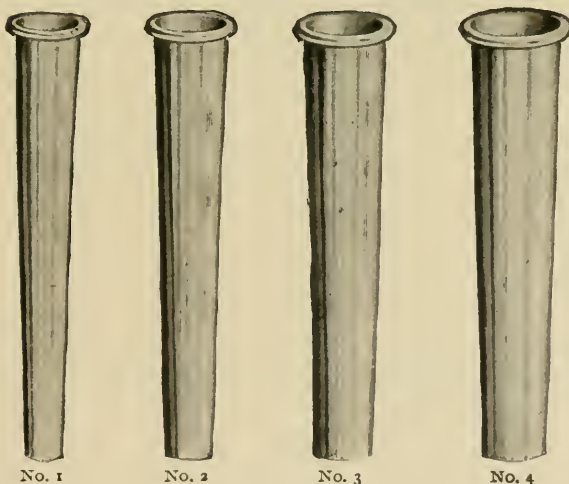


FIG. 362

These are made in four sizes, each being of uniform length, 6 inches over all, and made of the very best steel.

They are used in connection with squeezer Type Molding Machines, especially where pressure boards are used.

No. 1.	1 1/2	inches	bottom,	7/8	inches	at top.
No. 2.	5/8	"	"	1	"	"
No. 3.	3/4	"	"	1 1/8	"	"
No. 4.	7/8	"	"	1 1/4	"	"

Write for Prices

CHAIN SLINGS OF ALL DESIGNS

Figure 363 shows type of extra heavy sling chain with large hook with a ring in the center of each chain, and they are used by large



FIG. 363

foundries for handling flasks, large castings, etc. The Standard Sling Chains are made with grab hooks, each sling being from 10 feet to 15 feet in length.

Figure 364 shows an illustration of a light weight chain with ring in the center and grab hook on each end, and is used for light work. We furnish Chain Hooks and Chain Slings of any diameter and

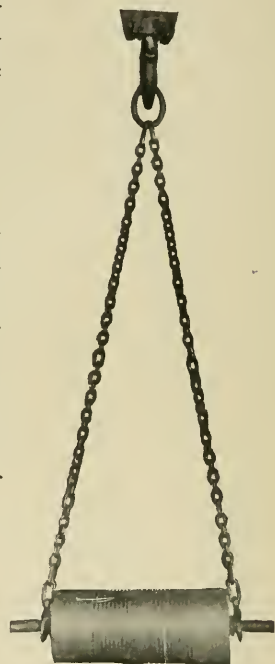


FIG. 364



FIG. 365

We furnish first-class tested Chains of any length and of any size of hook or ring desired.

Write for prices.

PATTERNMAKERS' UNIVERSAL SANDING TRIMMER

Will Grind Inside and Outside

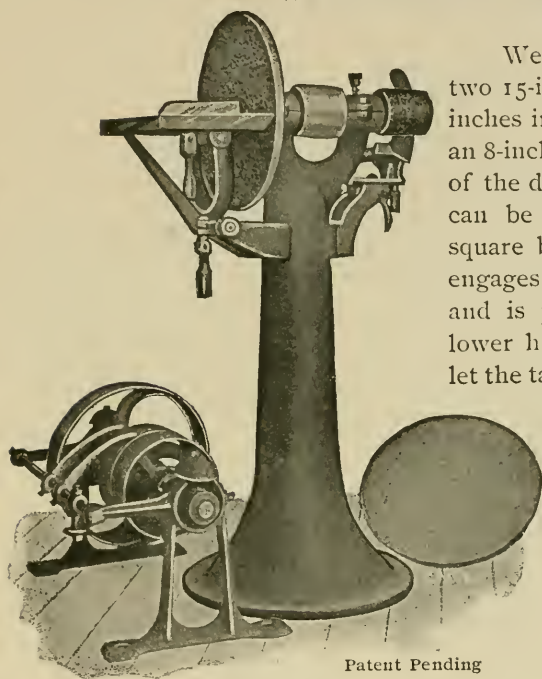


FIG. 366

Patent Pending

We furnish with each machine two 15-inch discs and one roll $3\frac{1}{2}$ -inches in diameter, but if necessary an 8-inch roll can be used. In front of the disc is a tilting table which can be tilted up or down or set square by means of an arm which engages the under side of the table and is pivoted on the end of the lower hinge which is also used to let the table drop away from the disc

when it is necessary to grind large surfaces. On top of the table is a gauge for grinding bevels, angles, etc., which is very handy, especially on duplicate work. On the opposite end of the shaft is a roll for grinding concave surfaces.

At the side of the roll is a gauge or vertical table, which can be set to any angle required, either obtuse, acute or square. The gauge can be moved to any part of the roll in an instant and clamped by means of a screw closing up the bearing, making the bearing very rigid, or can be removed entirely.

The spindle is made of machine steel and fitted to wick oiling bearings, so there is no chance of grit getting at the spindle and cutting it. All revolving parts are carefully balanced so there is no chance for vibration.

The machine is furnished complete as described above with counter-shaft. Machine weighs about 325 pounds, crated and boxed; floor space about 17 x 24 inches; height, 42 inches. We make this machine in one standard size, and as the discs are threaded and tapped with a standard tap, extra discs can be furnished to fit the machine at \$10.00 each. This machine is the most valuable Tool you can place in your pattern shop and you cannot afford to be without it.

List Price, \$100.00 Complete

Correspondence Solicited

Write for Discount

HAY ROPE TWISTING MACHINE

For Making Hay Rope for Cores

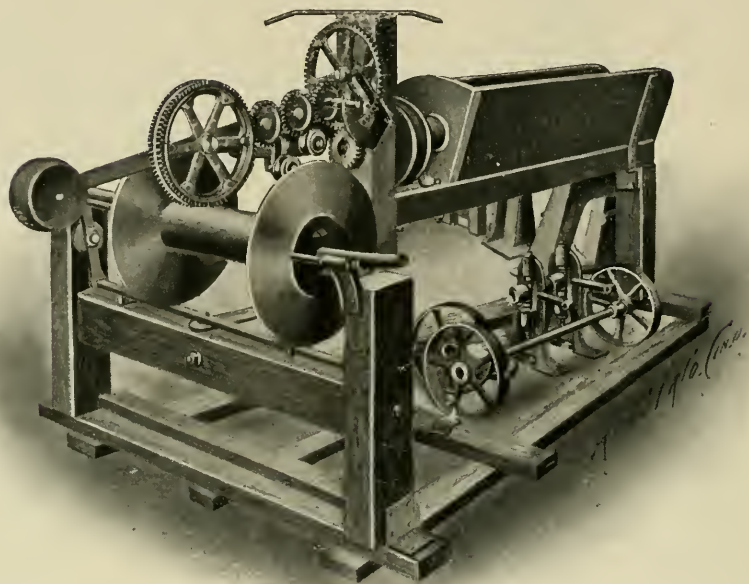


FIG. 367

It is economy to make your own hay rope; a boy can operate this machine successfully.

Pipe foundries, architectural iron works, and all foundries having a large amount of cylinder, column or pipe work will find one or more hay rope machines an invaluable assistance for manufacturing hay rope for cores.

The machine illustrated above is one which has been given very thorough and practical use in large pipe foundries, and is substantial and simple in construction.

We manufacture them suitable for making all sizes of rope, and supplied with or without the reels, as may be desired.

Price, \$250.00

These machines in stock.

PORTABLE MOLD DRIER

For Foundries

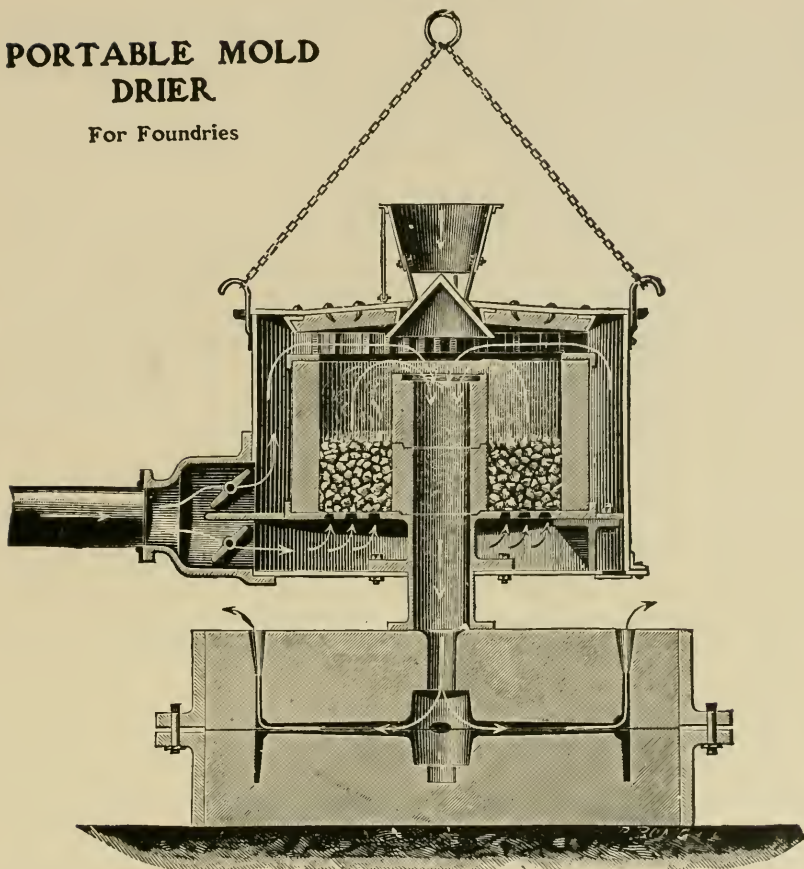


FIG. 368

This appliance is so arranged that air can be supplied from a blower or any ordinary air supply, and is regulated by two throttle valves in the inlet pipe ; part of the air passing underneath the grate and part up the mantle, as shown in the illustration. The fuel should be small gas coke which is fed from the top.

Chief advantages are :

That the mold can be dried on the spot.

Saves time (one to two hours as a rule being sufficient).

Great economy in fuel, etc.

Satisfactory results with the least amount of labor.

Made in the following sizes :

Size.	Diameter of Mantle.	Height of Mantle.	Height Over All.	Weight of Iron Part.	List Prices.
0	21 inches	22 inches	32 inches	510 lbs.	\$240 00
1	30 "	23 "	44 "	1,240 lbs.	330 00
2	40 "	28 "	48 "	1,820 lbs.	450 00
3	52 "	40 "	62 "	2,550 lbs.	570 00

This apparatus may be suspended on the crane or set direct upon upper part of flask when properly supported.

For further particulars and information, write us.

THE OBERMAYER PORTABLE COMPRESSED AIR OIL HEATER

For Foundries

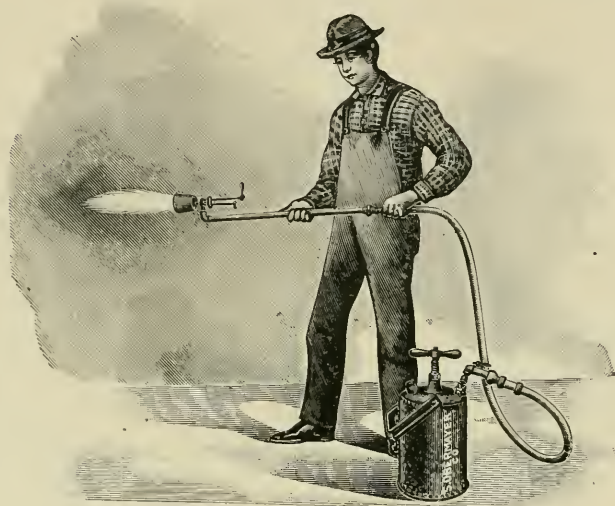


FIG. 369

The burner does not require heating before it generates the gas.

It is used for skin drying molds and cores. Foundrymen who use it lose less castings; they get a better surface on the work, and there is nothing that has proved a greater money-saving investment than the use of these driers for skin drying molds. It takes about one-quarter the time required when compared to the old method of charcoal drying, and you are able to have your dry sand molds ready to pour the same day.

It can be used successfully to fire the coke in the cupola, thus doing away with the use of kindling wood.

It is a combination machine.

All that is required extra is to purchase an "Obermayer Light Burner."

Size No. 3. Flame about 20 inches \$150.00

Extra burner and 12½ ft. hose 40.00

We sell more of this kind than all other sizes combined and find it the most useful for all purposes. Made for kerosene or coal oil only.

Size No. 4. Flame about 25 inches \$200.00

Extra burner and 25 ft. hose 50.00

Made especially for heating operations, for large, heavy work.

These sizes can be arranged fitted with any number of burners desired. Further correspondence solicited.

OBERMAYER'S BLACKING SWAB

For Dry Sand Work



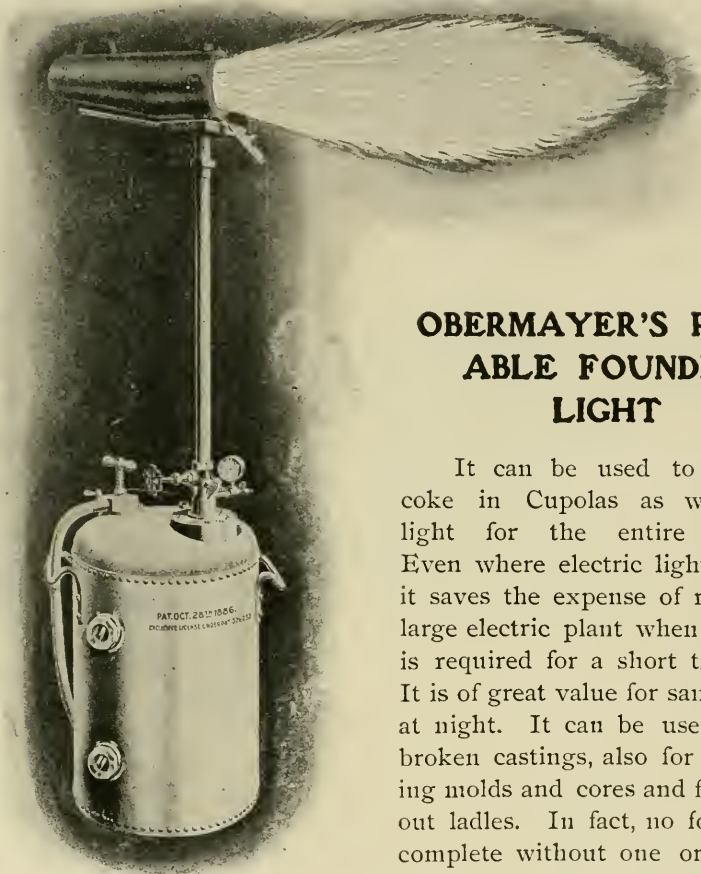
FIG. 370

Used Where a Supply of Compressed Air is Available

The **Obermayer Blacking Swab** is especially adapted for **Skin Drying Molds**, and the quickest results on general work are secured when operated by compressed air. A great amount of time is saved by adopting its usage. The blacking is distributed more uniformly, thus producing a coating which prevents the iron from burning in the sand. It facilitates the work of slicking and will save its cost in a very short time. It is operated by hand and will be found serviceable for spraying liquids on cores. It applies the liquid blacking more thoroughly than is possible by the ordinary method of putting it on the mold or core with a flax or hemp swab and then drying the mold. Can be used on green sand molds equally as well.

Price, Complete, \$20.00

It will pay you to adopt the use of these Swabs



OBERMAYER'S PORT- ABLE FOUNDRY LIGHT

It can be used to fire the coke in Cupolas as well as a light for the entire foundry. Even where electric light is used, it saves the expense of running a large electric plant when the light is required for a short time only. It is of great value for sand cutting at night. It can be used to heat broken castings, also for skin drying molds and cores and for drying out ladles. In fact, no foundry is complete without one or more of these labor saving machines.

FIG. 371

Prices as follows:

Size No. 2.	1,000 to 1,200 candle power	\$150.00
	Extra burner	18.00
	Tank, 16 x 22. Oil consumed, $\frac{3}{4}$ gallon per hour.	
Size No. 3.	2,000 to 2,500 candle power	\$200.00
	Extra burner	25.00
Most general size in use for all purposes. We sell more of No. 3 size than all other sizes combined. Tank, 18 x 27. Oil consumed, $1\frac{1}{4}$ gallons per hour.		
Size No. 5.	4,000 candle power	\$220.00
	Extra burner	40.00
	Same size tanks and fittings as No. 3 size. Oil consumed, $1\frac{3}{4}$ gallons per hour.	
Jumbo Size.	Flame about 5,000 candle power	\$350.00
	Extra burner	50 00
Valuable where a large, powerful light is required. Tank, 24 x 32. Oil consumed, about 2 gallons per hour.		

Unless advised to the contrary, we send an extra burner with each light, and make charge for same.

THE OBERMAYER OIL RIVET FORGE

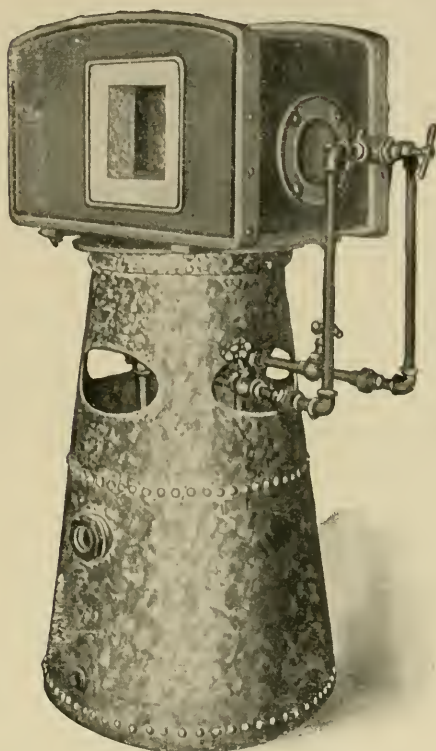


FIG. 372

The Rivets are always in plain sight, quickly heated and easily reached. The Forge is operated by compressed air at from 20 to 40 lbs. pressure. Will heat from 100 to 500 rivets per hour according to size.

This Forge can also be used for hardening, tempering and annealing, as well as for light forging. Will burn any Kerosene Oils, crude or refined, the oil being atomized by compressed air, a supply of which can be connected to the machine by hose similar to other pneumatic tools, and is easily adapted for all classes of work.

It is the most satisfactory heater yet invented as an Oil Rivet Forge.

Price of This Machine is \$190.00

Net weight, 300 lbs. Gross weight, 450 lbs.

A useful machine about your works

RECTANGULAR CORE OVENS

The accompanying illustrations show the construction of our standard design for rectangular core ovens. We supply the complete fittings, including Racks and Shelves, Steel Door with guides and counter-weights, Structural Steel for roof, Top Flue Plate, Furnace and Ash Pit Doors and Frames.

In asking prices, give size of oven and state number of shelves desired.

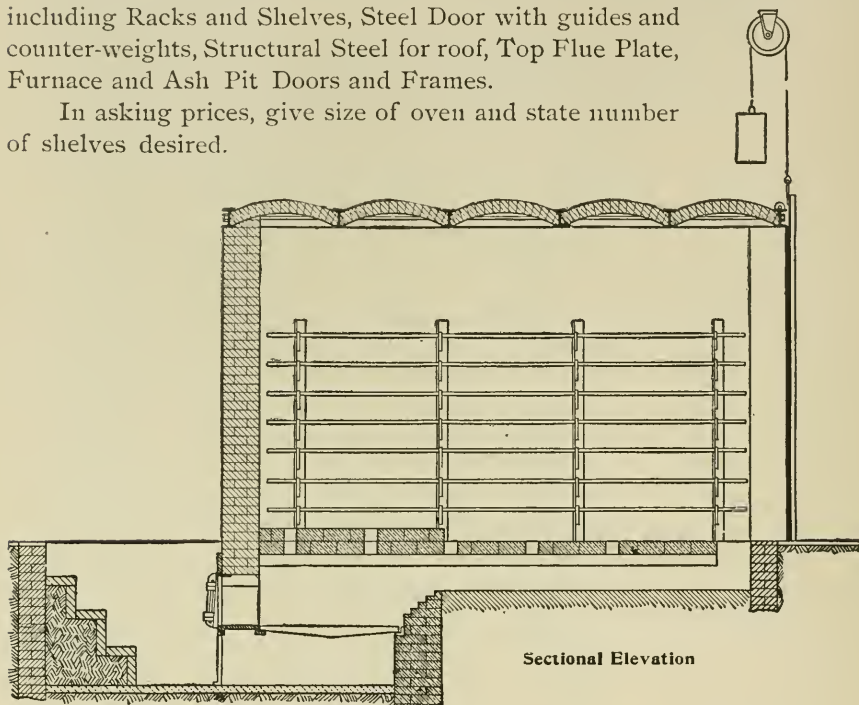


FIG. 373

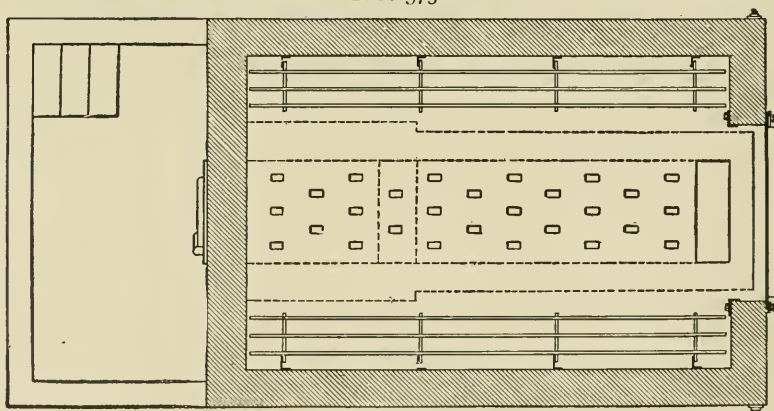


FIG. 374

Complete detailed drawing of masonry is furnished if order is placed for full equipment.

CORE OVEN FITTINGS

Revolving Core Ovens

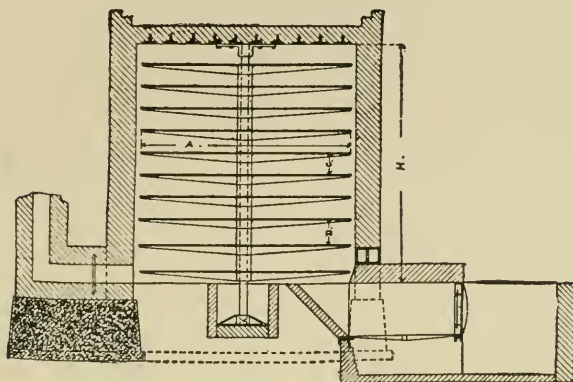


FIG. 375

Sectional Elevation

The oven shelves turn with the greatest ease. The shelves being made of open grating, a good circulation of hot air is assured.

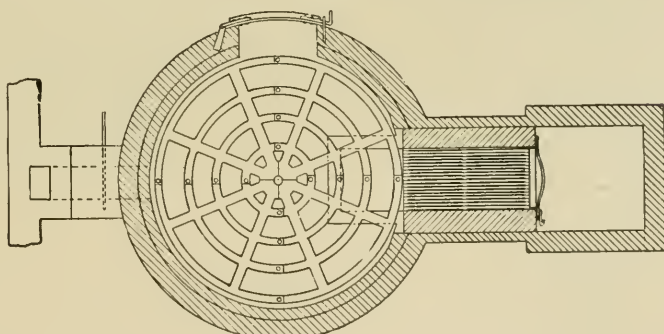


FIG. 376

Plan

For light work and many other purposes, a decided improvement over a stationary or fixed shelf type of oven. We supply all iron work, including shelves, central pivot shaft, top and bottom bearings, steel doors and structural steel roof framing, furnace and ash pit doors and frames, grate bars and supports.

Complete detailed drawing of masonry and brick work is furnished if order is placed.

This oven is especially serviceable when used in connection with a portable core bench.

In asking for prices, mention any special requirements and state number of shelves wanted.

Oven Number.	Diameter of Shelves "A."	Height "H."
No. 12	6 feet	6 feet
No. 14	8 feet	7 feet

Six shelves are standard and supplied unless otherwise specified.

Long experience and our present facilities enable us to turn out work of this kind that has every point of merit and is beyond competition both in design and workmanship.

CORE OVEN RACKS

We have standard patterns for oven racks and can supply them with or without shelf bars, as desired.

Shelves adjustable to suit requirements.

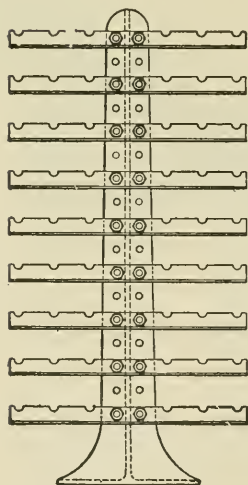


FIG. 377

Self-Supporting Rack

Self-Supporting Racks

Width.	Height.
4 feet	6 ft. 6 in.

Wall Racks

Width of Shelf.	Height of Rack.
17 inches	5 ft. 8 in.
30 inches	6 ft. 6 in.

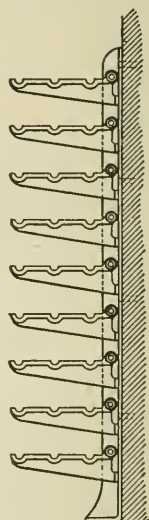


FIG. 378

Wall Rack

Shelf Bars, Grates, Oven Doors, etc., to order.

BRISTOL'S RECORDING THERMOMETER

Makes Continuous Record of Temperature Day and Night

For Core Ovens, Heaters, Hot Blasts, Feed Water
and Steam Boilers, etc.

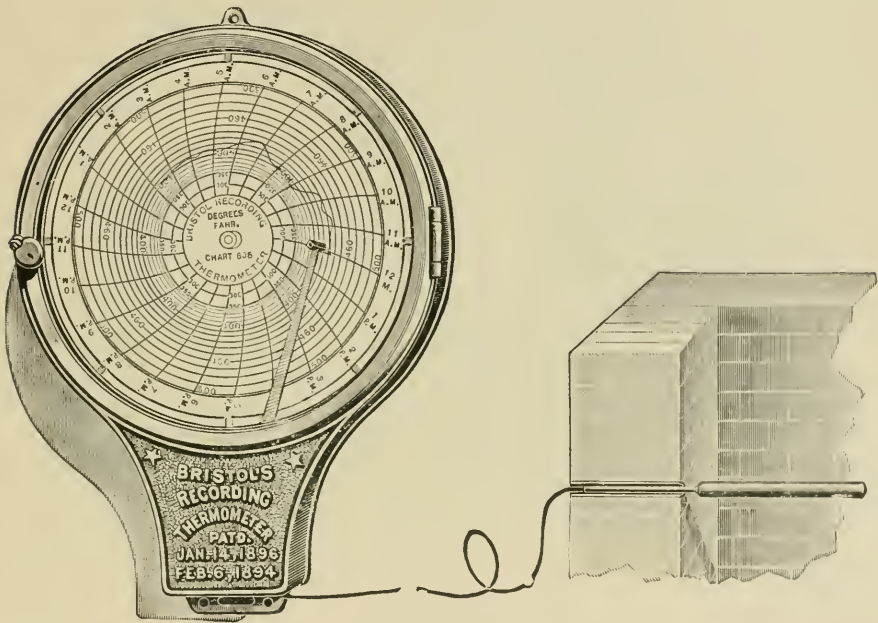


FIG. 379

The operation of this Thermometer is entirely independent of pressure at the point where it is located.

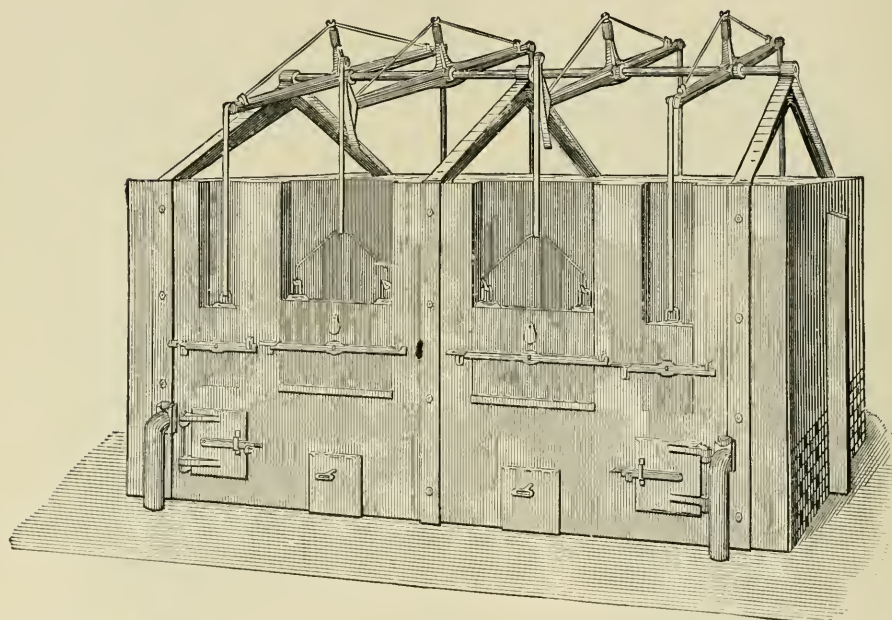
For working ranges of temperature between 100 and 500 degrees Fahrenheit.

It is partly filled with alcohol, which produces variations of pressure, according to temperature.

In ordering thermometers state maximum working range of temperature.

Prices on application.

CASE-HARDENING AND ANNEALING FURNACES



Left-Hand

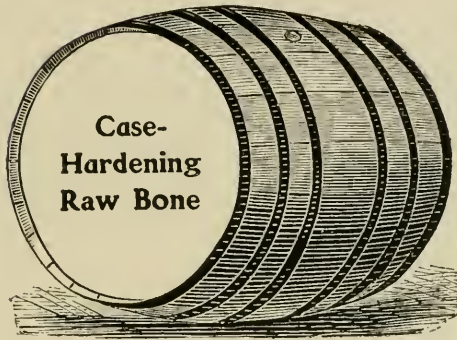
FIG. 380

Right-Hand

No. 2 Furnace—Double

This Furnace is made in three sizes and designed for either Annealing or Case Hardening.

Prices and full descriptions given in Special Catalogue which will be gladly mailed on application.



CASE-HARDENING RAW BONE

Our Granulated Raw Bone for case-hardening is free from brass, lead or other metal which will melt when heated. Can be used over and over again by simply adding a portion of fresh stock. The quality is of the best, the material being put up in five different numbers to denote size of the particles. For extra heavy work use the clear Raw Bone. To produce colored work, Charred Granulated Raw Bone is found most satisfactory. Use our Pameacha Raw Bone on small work where a hard surface without color is required. Directions furnished upon application. Pulverized Charcoal always kept in stock. Correspondence solicited.

ANNEALING

We furnish Granulated Charcoal for annealing purposes, and recommend in packing the work to use charred bones. The article should remain in packing boxes until all heat has passed away. Further information given upon application.

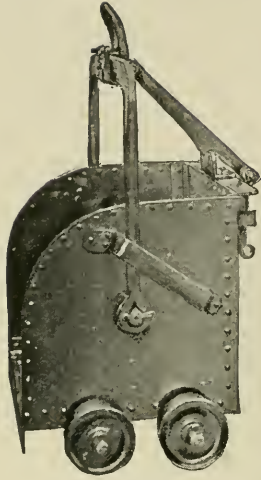


FIG. 381

PIG-IRON BUCKETS AND BUCKET TRUCKS

We manufacture to order pig-iron, ore and coal buckets, and also mine and yard cars to fulfill any requirements. Estimates furnished on receipt of data.

Write For Prices

CORE OVEN TRUCKS

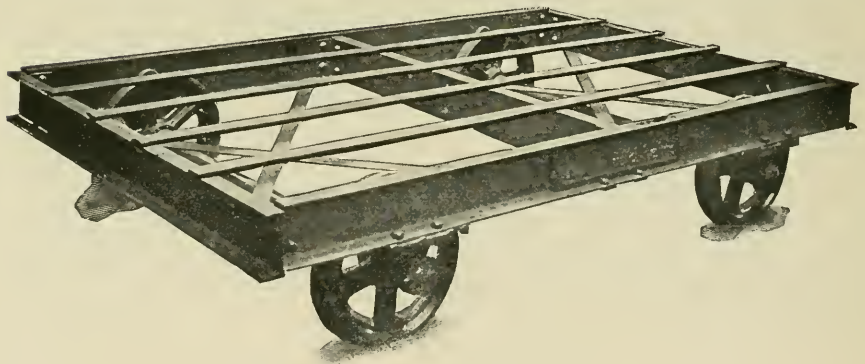


FIG. 382

Truck without Racks.

These trucks are designed especially for the severe duty required in coke oven work. The steel frames are very heavy, and securely braced against warping. The axles are of steel, fitted to chilled wheels and turning in steel anti-friction roller bearings. These bearings require no oil, and the movement of the trucks on the track is very easily accomplished. The trucks are supplied with or without racks and shelves as desired. Special estimates are made on shelves and racks to suit the cores.

See cuts and descriptions of Tracks and Turntables

CORE OVEN CARS

With Racks and Shelves, Steel Anti-Friction Roller Bearings

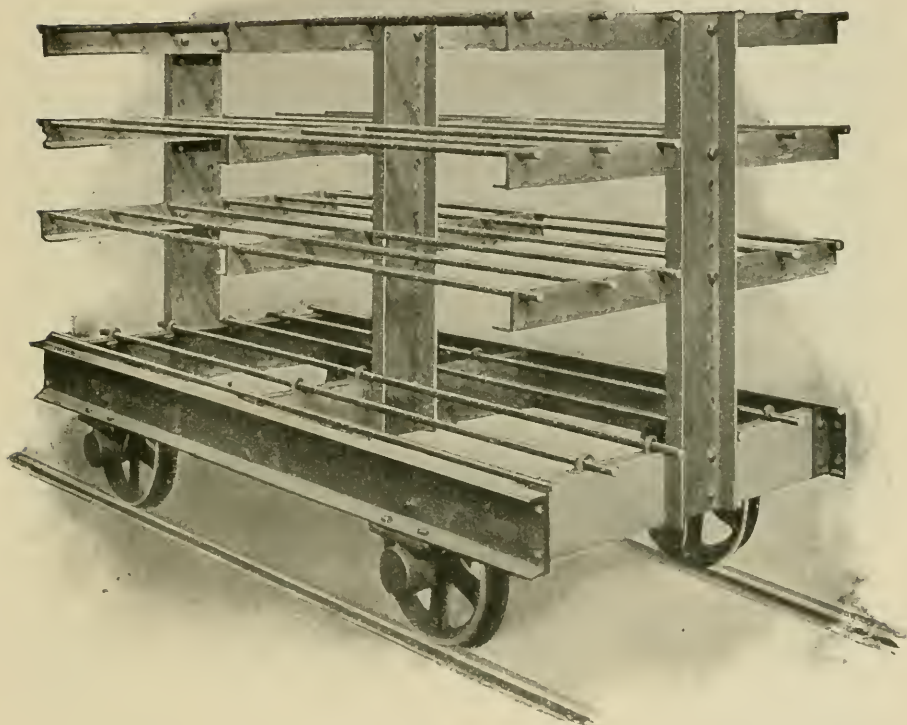


FIG. 383

Racks and supports are structural steel, shelves are steel rods. Racks are easily removable and heights are adjustable by 3 inch spaces. Bottom is made of flat steel bars laid lengthwise. Illustration shows car with three extra shelves.

List of Standard Sizes

Capacity.	No.	Gauges.	Size of Frame.	Height	No. of Shelves.	State capacity and number of shelves wanted and we will quote you prices.
1 ton	51	30" to 36"	Ga'ge +11 "x 6'	6'-0"	4	
2 "	52	30" to 36"	" +11 "x 6'	6'-0"	4	
3 "	53	30" to 36"	" +11 "x 8'	6'-0"	4	
5 "	55	30" to 36"	" +11½ "x 8'	6'-0"	4	
10 "	59	30" to 36"	" +13½ "x 8'	6'-0"	4	
1 "	61	4' 0" to 4' 8½"	" +11 "x 8'	6'-0"	4	
2 "	62	4' 0" to 4' 8½"	" +11 "x 8'	6'-0"	4	
3 "	63	4' 0" to 4' 8½"	" +11 "x 8'	6'-0"	4	
5 "	65	4' 0" to 4' 8½"	" +11½ "x 10'	6'-0"	4	
10 "	69	4' 0" to 4' 8½"	" +13½ "x 10'	6'-0"	4	

Special sizes made to order.

Investigate Our Core-Making Machinery

IMPROVED SELF-CONTAINED TURNTABLE

**Solid, Strong, Easy Turning, Non-Tipping. Unexcelled for
Yard or Shop Tramways**



FIG. 384

Illustration shows standard turntable with frogs, and represents the most efficient and easiest running turntable manufactured. There is no tipping, no getting out of line, no trouble keeping in order, no trouble to put in place, no journal friction.

Being a solidly constructed and self-contained design, a cheaper foundation may be used than for other tables, and it is very quickly set in place.

There is no center bearing. The entire load is on the chilled rollers, turning on roller path near the outside of the table, and these are conical and cannot slide or grind against each other as in a ball bearing table, being held rigidly apart by spacing frame. There is, therefore, only rolling friction. The result is an exceedingly easy turning table. No oil is required. Dirt does not lodge on the roller paths.

The track rail may be cast on top, as shown in cut on page 284, or grooves for wheel flanges may be formed to suit any gauge, if specially ordered. Flat top, as shown above, is standard.

Frogs or guard rails supplied at extra cost.

Turntables Carried in Stock

TURNTABLES



FIG. 385

**Shipment of Turntables, Showing Standard Construction and
With Track Rail Cast on Top**

We guarantee these turntables to be satisfactory. They are manufactured in the following sizes:

Diameter of Turntable.	Gauge of Track that may be Used.	Largest Wheel Bases of Trucks or Cars that may be used, with corresponding Gauges.
42 inches	18 inches to 21 inches	2 feet 3 inches to 2 feet
48 inches	18 inches to 30 inches	3 feet to 2 feet
60 inches	18 inches to 36 inches	4 feet to 3 feet
72 inches	24 inches to 36 inches	4 feet to 4 feet 6 inches
96 inches	36 inches to 4 feet 8½ inches	6 feet 6 in. to 5 feet 3 in.

Frogs or guard rails supplied extra.



FIG. 386

Turntable Showing Cover Removed

See Our Industrial Railway System

SURFACE TRACKS AND TRAMWAYS

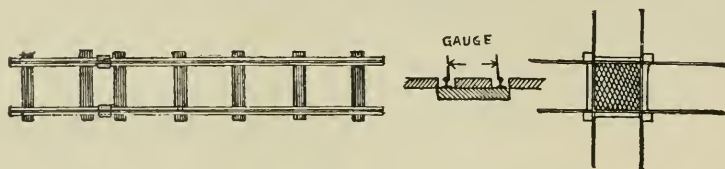


FIG. 387

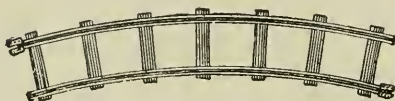
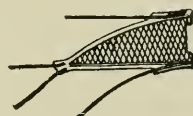


FIG. 388



Tracks. We furnish T rail tracks, with or without ties, or all ready to put in place in sections, as desired. Send length of track and particulars.

Frogs. For shop and yard tramways, turntables, etc. Made with lugs to bolt to turntables, holes in flanges to spike to ties. Made of hard, strong iron. When frogs are used the raised track on top of table is not necessary; the flare of frog guiding truck wheel onto rail even though table is not placed accurately.

Switches. Suitable for all gauges and rails; for shop tramways, mine tramways, for temporary work and permanent way.

Crossings. For shop tracks. Made with either grooves or raised rail. Extra hard iron used in these castings.

T Rail. Of all weights and lengths. Straight or curved.

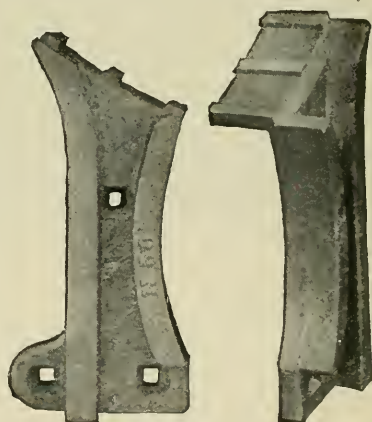


FIG. 389

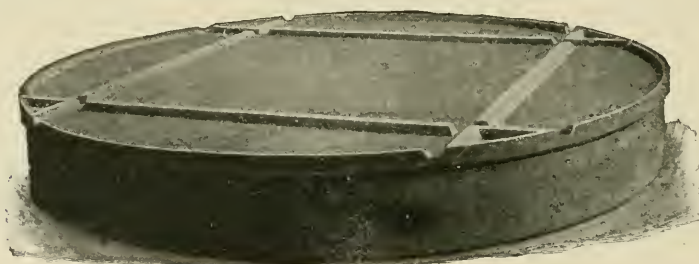


FIG. 390

Eight-Foot Turntable, Special. Twenty-Five Made for Mexican Central Railroad

CARS AND TRUCKS

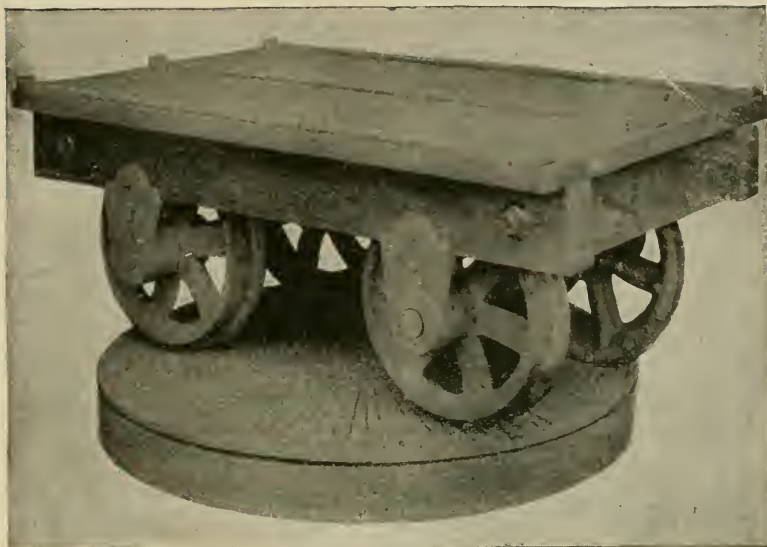


FIG. 391

Standard Wooden Frame Truck

Standard Oak Truck

The above cut shows our Standard Truck for shop use. The frame of this truck is made of heavy oak, iron bound. It is fitted with steel axles, steel roller bearings and chilled wheels. This truck is made especially for heavy work, and will give much better service than the ordinary "stock warehouse" truck. It may be made with swiveled front axle and flat wheels, for use on smooth floors, if desired.

We manufacture it in the following sizes. Special sizes made to order.

Capacity.	Number.	Gauge.	Approximate Size of Platform.	Diam. Wheels.	Number	Gauge.	Approximate Size of Platform.	Diam. Wheels.
1 ton	1	18 to 24 ins.	3 x 4 feet	12 in.	11	30 to 36 in.	4 x 5 ft.	12 in.
2 ton	2	18 to 24 ins.	3 x 4 feet	16 in.	12	30 to 36 in.	4 x 5 ft.	16 in.
3 ton	3	18 to 24 ins.	3 x 4 feet	16 in.	13	30 to 36 in.	4 x 5 ft.	16 in.
5 ton	5	18 to 24 ins.	3 x 4 feet	16 in.	15	30 to 36 in.	4 x 5 ft.	16 in.
10 ton	10	18 to 24 ins.	3 x 4 feet	20 in.	110	30 to 36 in.	4 x 6 ft.	20 in.

For Standard Railway Gauge, platform is about 5 feet wide by 8 feet.

Our Standard Steel Frame Truck, frame entirely of steel, made in same sizes and capacities as given in table.

When writing for prices give capacity and gauge of track desired

EMERY WHEELS

FOR GRINDING CASTINGS

**WE HANDLE EMERY WHEELS ESPECIALLY ADAPTED
FOR FOUNDRY USE**

**In Ordering State for What Purpose Required and We
Will Furnish You a Wheel Which
We Guarantee**

**We Can Furnish You Any Make of EMERY, CORUNDUM
or CARBORUNDUM Wheel Wanted at
Lowest Ruling Prices**

WE HAVE EMERY WHEEL GRINDERS OF ALL KINDS

See illustrations with prices.



PORTABLE EMERY WHEEL GRINDER

A most popular tool. Does the work as rapidly as a stationary Emery Grinder, and you "take the tool to the work instead of the work to the tool"—saves handling.

Thousands of them are in use.

The complete plant as illustrated consists of the following:

- 1 Flexible Shaft.
- 1 Stop Clutch.
- 1 Clamp Spindle.
- 1 Countershaft.
- ft. Rawhide Rope.
- Pairs Couplings.

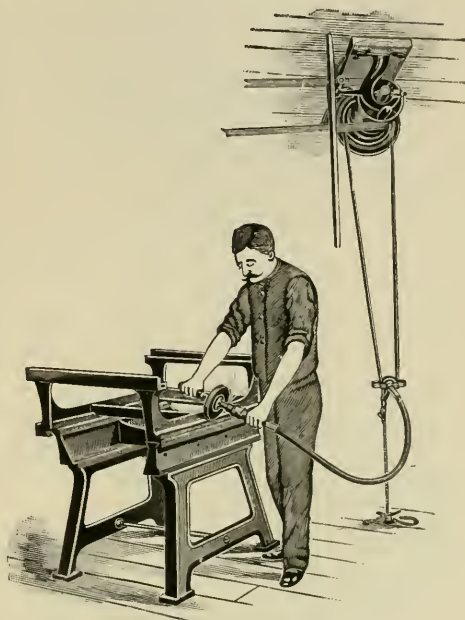


FIG. 392

Various plants are listed as follows (less rawhide rope and couplings), cost depending upon height of ceilings.

No. 3	will run Emery Wheel 4 in. x $\frac{3}{4}$ in	...	\$ 69.00
" 4	" " " " 6 " x 1 "	...	79.75
" 5	" " " " 8 " x 1 "	...	106.50
" 6	" " " " 10 " x 1 "	...	133.50

Rawhide Rope for Nos. 3 and 4 plant . . . \$0.50 per foot

Rawhide Rope for Nos. 5 and 6 plant60 per foot

Couplings for Nos. 3 and 450 per pair

Couplings for Nos. 5 and 61.00 per pair

\$18.00

List

For No. 4

\$22.50

List

For Nos.

5 and 6

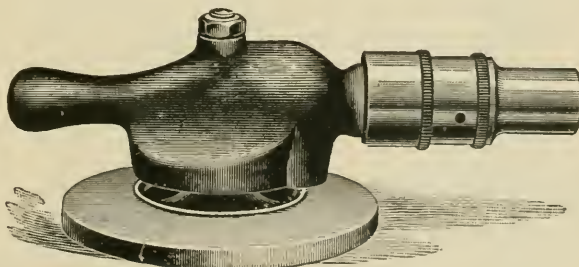


FIG. 393

Use
"D" Machine
for
Grinding
Flat
Surfaces

Write for Discount

VULCAN EMERY WHEEL GRINDERS

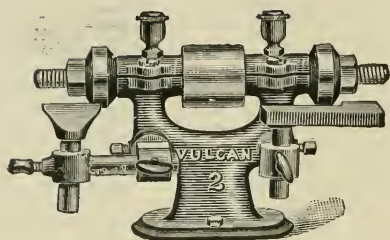


FIG. 394

No. 2 Vulcan Grinder

For two 6 x $\frac{3}{4}$ inch wheels with rest.

Price, \$9.00

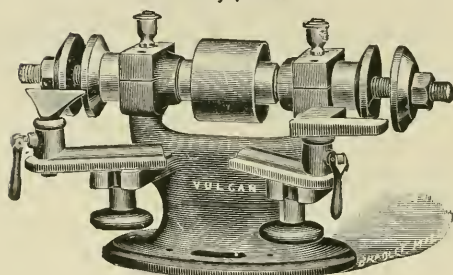


FIG. 395

No. 3 Vulcan Grinder

For two 10 x $1\frac{1}{2}$ inch wheels.

Price, \$12.00

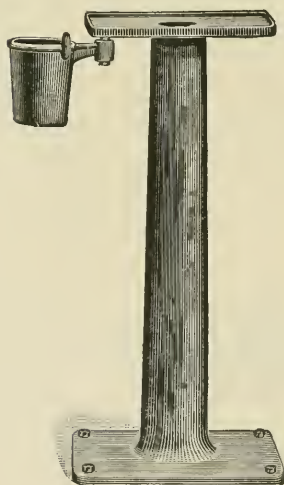


Fig. 396

Column

For Nos. 1, 2 and 3 Grinders.

Price, \$12.00

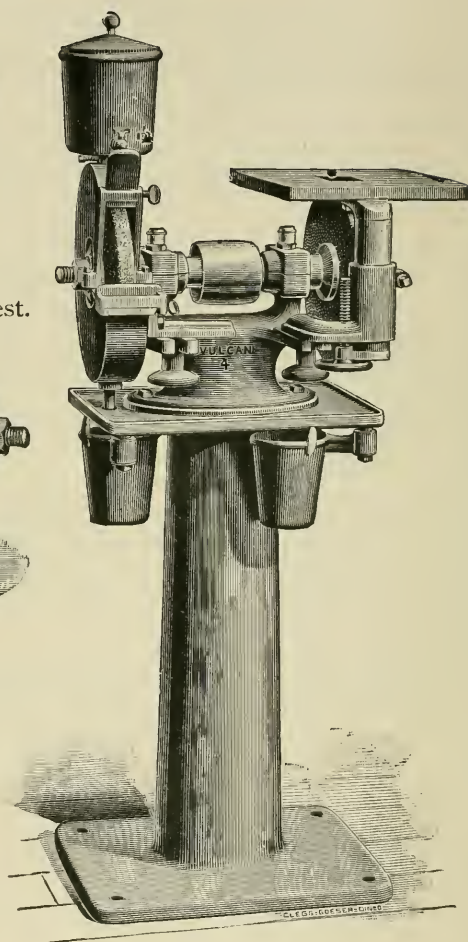


FIG. 397

No. 4 Grinder

With Surfacers and Water Attachment for two 12 x 2 inch wheels.

Price, as shown, without Wheels, \$63.00

All boxes arranged to take up wear.

We can furnish our No. 1 Grinder without rests, designed for two 6 x $\frac{3}{4}$ inch Emery Wheels.

Price, \$6.00 each

State plainly if head only is wanted.

"We make a full line of **Belt Driven Grinders.**"

EMERY WHEEL GRINDERS

No. 4½ Vulcan Grinder

For two 12 x 2 inch wheels.
Extra heavy machine.

Price, as shown, \$42.00

A good size for general
Foundry use.

No. 7 Vulcan Grinder

Will carry two wheels 24 to 30
inch diam. 4 inches thick.

Price, Complete with Counter but
no Emery Wheels, \$130.00

Motor driven machines
furnished.

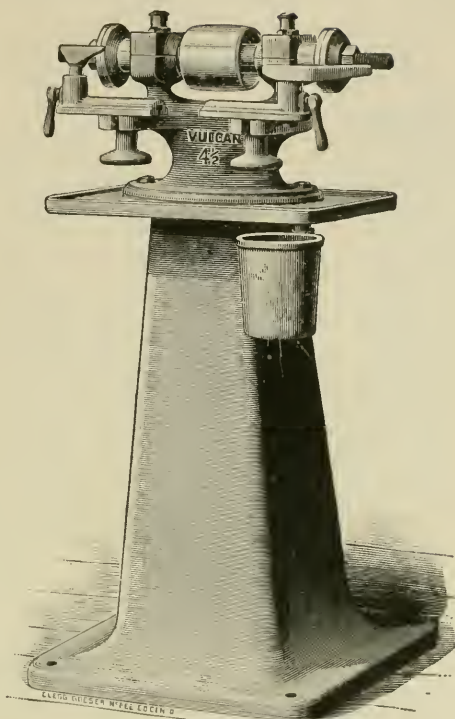


FIG. 398

No. 4½ Grinder

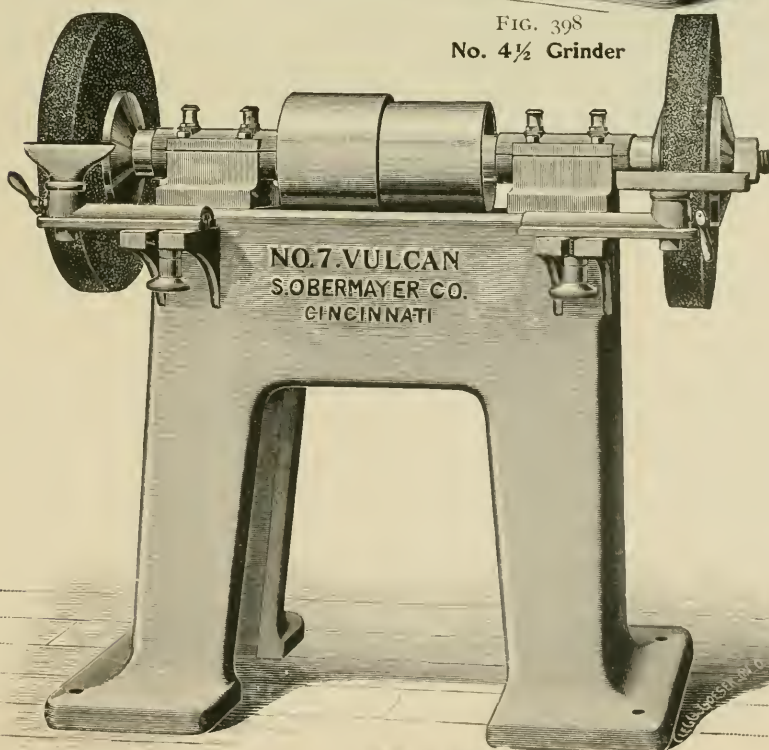


FIG. 399 No. 7 Grinder

DOUBLE WHEEL TOOL GRINDING MACHINE

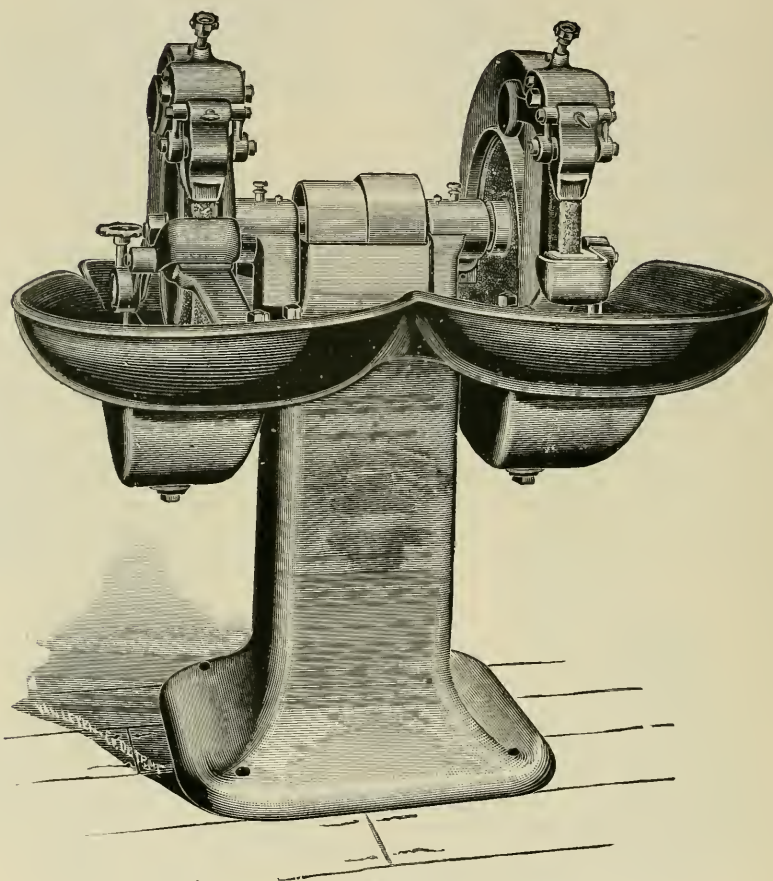


FIG. 400

No. 2 Tool Grinder

The Bearings are $2\frac{1}{8}$ inches diameter, 8 inches long. The Emery Wheels are 24 inches diameter, $1\frac{1}{2}$ -inch face. The distance between Emery Wheels is $25\frac{1}{2}$ inches. The machine, crated for shipment, weighs 1750 lbs. The proper speed for Countershaft is 440 revolutions per minute. This gives 716 revolutions per minute for Wheel Spindle.

Including Countershaft and Two Emery Wheels, Mounted on
Machine \$300.00

We make a Single Wheel Tool Grinding Machine carrying one 24-inch wheel. If interested, send for circular.

MOTOR DRIVEN GRINDERS

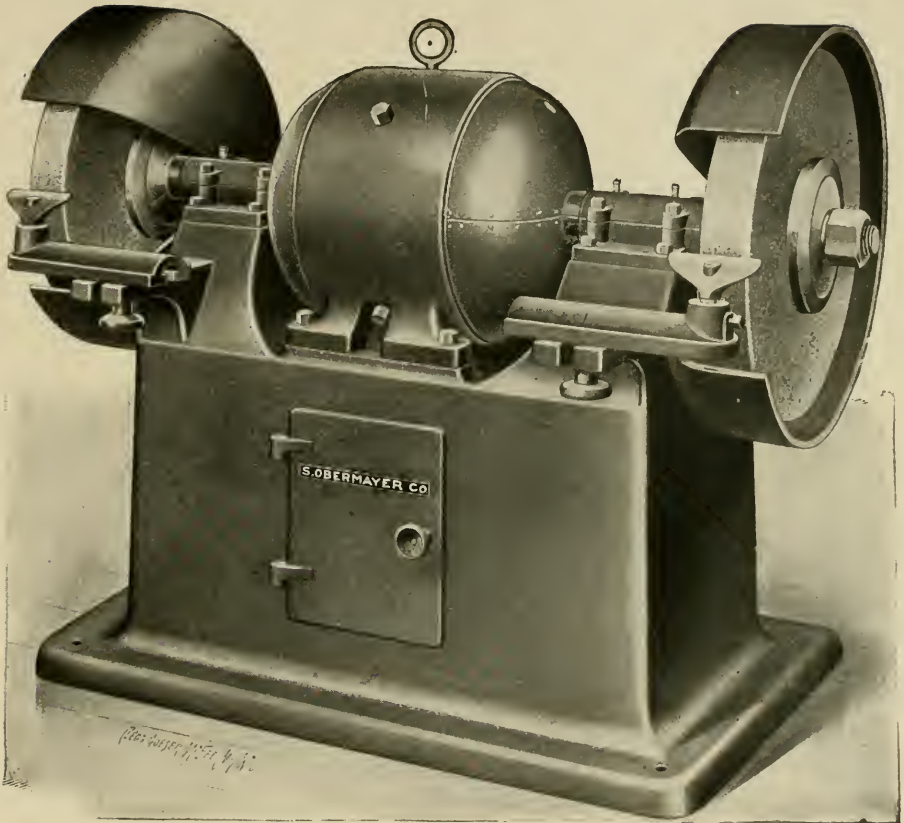


FIG. 401

We call your special attention to this tool for use in the foundry. It does not need a long line shaft running to that building merely for the purpose of operating a fan and an emery wheel. That line shaft costs lots of dollars and costs lots more to operate.

General Description

A 5 H. P. motor is placed directly on the arbor. This motor is capable of a 50% overload for a considerable time. It is entirely enclosed to prevent emery dust from reaching its parts. Yet there is part of the hood that can be readily removed to allow the operator to adjust the brushes.

The armature is wound upon a sleeve which in turn is keyed to the arbor. The starting device can be placed inside of machine, on wall or any convenient place.

The journals are dust proof and are each provided with two rings running in large chambers below arbor, and which keep constantly placing oil on top of arbor.

Entire length of arbor 49 inches. Journals are $1\frac{9}{16} \times 9$ inches. Diameter of collars 8 inches. Diameter of arbor between collars $1\frac{1}{2}$ and 3 inch space. Floor space 48 x 26 inches. Height floor to arbor 34 inches.

Attention is called to the SOLIDITY of this tool. The journals are long and placed close to emery wheels. These journals are not supported from motor, but are entirely independent and are therefore very rigid. It "runs like a top" in the boxes, as there is no belt to pull it to one side.

Prices and further particulars upon application.

OUR SOLID EMERY OR CORUNDUM WHEELS

Price List

Diameter in Inches.	THICKNESS IN INCHES															No. of Revo- lutions Per Min.
	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	
1 1/2	0 40	0 45	0 50	0 55	0 60	0 65	0 70	0 75	0 80	0 85	0 90	0 95	1 00	1 05	1 10	12,000
2	50	55	60	65	70	75	80	85	90	95	1 00	1 05	1 10	1 15	1 20	10,000
2 1/2	65	70	75	80	85	90	95	1 00	1 05	1 10	1 15	1 20	1 25	1 30	1 35	8,500
3	80	85	90	95	1 00	1 05	1 10	1 15	1 20	1 25	1 30	1 35	1 40	1 45	1 50	7,000
3 1/2	95	1 00	1 05	1 10	1 15	1 20	1 25	1 30	1 35	1 40	1 45	1 50	1 55	1 60	1 65	6,000
4	1 10	1 15	1 20	1 25	1 30	1 35	1 40	1 45	1 50	1 55	1 60	1 65	1 70	1 75	1 80	5,300
4 1/2	1 25	1 30	1 35	1 40	1 45	1 50	1 55	1 60	1 65	1 70	1 75	1 80	1 85	1 90	1 95	4,700
5	1 40	1 45	1 50	1 55	1 60	1 65	1 70	1 75	1 80	1 85	1 90	1 95	2 00	2 05	2 10	4,200
6	1 75	1 80	1 85	1 90	1 95	2 00	2 05	2 10	2 15	2 20	2 25	2 30	2 35	2 40	2 45	3,500
7	2 15	2 20	2 25	2 30	2 35	2 40	2 45	2 50	2 55	2 60	2 65	2 70	2 75	2 80	2 85	3,000
8	2 60	2 65	2 70	2 75	2 80	2 85	2 90	2 95	3 00	3 05	3 10	3 15	3 20	3 25	3 30	2,600
9	3 10	3 15	3 20	3 25	3 30	3 35	3 40	3 45	3 50	3 55	3 60	3 65	3 70	3 75	3 80	2,300
10	3 65	3 70	3 75	3 80	3 85	3 90	3 95	4 00	4 05	4 10	4 15	4 20	4 25	4 30	4 35	2,100
12	4 60	4 65	4 70	4 75	4 80	4 85	4 90	4 95	5 00	5 05	5 10	5 15	5 20	5 25	5 30	1,700
14	6 25	6 30	6 35	6 40	6 45	6 50	6 55	6 60	6 65	6 70	6 75	6 80	6 85	6 90	6 95	1,500
16	8 00	8 05	8 10	8 15	8 20	8 25	8 30	8 35	8 40	8 45	8 50	8 55	8 60	8 65	8 70	1,300
18	9 50	9 55	10 00	10 05	10 10	10 15	10 20	10 25	10 30	10 35	10 40	10 45	10 50	10 55	10 60	1,150
20	11 25	11 30	11 35	11 40	11 45	11 50	11 55	12 00	12 05	12 10	12 15	12 20	12 25	12 30	12 35	1,050
22	13 00	13 05	13 10	13 15	13 20	13 25	13 30	13 35	13 40	13 45	13 50	13 55	14 00	14 05	14 10	950
24	15 00	15 05	15 10	15 15	15 20	15 25	15 30	15 35	15 40	15 45	15 50	15 55	16 00	16 05	16 10	850
26	17 00	17 05	17 10	17 15	17 20	17 25	17 30	17 35	17 40	17 45	17 50	17 55	18 00	18 05	18 10	750
30	21 00	21 05	21 10	21 15	21 20	21 25	21 30	21 35	21 40	21 45	21 50	21 55	22 00	22 05	22 10	700
36	25 00	25 05	25 10	25 15	25 20	25 25	25 30	25 35	25 40	25 45	25 50	25 55	26 00	26 05	26 10	525
42	31 00	31 05	31 10	31 15	31 20	31 25	31 30	31 35	31 40	31 45	31 50	31 55	32 00	32 05	32 10	350
48	37 00	37 05	37 10	37 15	37 20	37 25	37 30	37 35	37 40	37 45	37 50	37 55	38 00	38 05	38 10	300

DIAMETER OF WHEELS

Wheels less than Half-inch Thick Same Price as Half-Inch.

When ordering, state diameter, thickness, size of hole or arbor and grade desired, whether very hard, medium, soft or very soft

We can furnish you any make Emery Wheel at Lowest Prices

THICKNESS IN INCHES

PORTABLE FOUNDRY SCALES

This scale is made especially heavy in all its parts, with drop lever, and is thus adapted for general foundry use. If desired, it can be furnished with sliding poise and without drop lever.



FIG. 402

Extra Heavy, with 12-Inch Wheels, Drop Lever and Notched Beam

No. 1. Capacity, lbs., 3000 x $\frac{1}{2}$. Platform, inches, 31 x 40 . . \$175.00

Without Drop Lever.

No. 2. Capacity, lbs., 3000 x $\frac{1}{2}$. Platform, inches, 31 x 40 . . \$175.00

ROLLING MILL OR IRON SCALES

With Rubber Spring Platform Rack

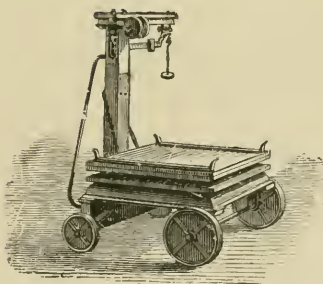


FIG. 403

The platform of this scale is especially made to meet the rough usage customary in weighing iron, and is constructed in two parts, between which are large rubber springs. In this way the jars and sudden strains incidental to such weighing are kept from the more sensitive parts of the scale. The swinging front axle and handle contribute largely to its convenience in use.

With Sliding Poise

No.	Capacity, Lbs.	Platform, In.	Price.
1416	2,500 x $\frac{1}{2}$	23 x 32	\$125.00
1418	4,000 x $\frac{1}{2}$	31 x 40	160.00
1420	6,000 x $\frac{1}{2}$	31 x 40	185.00
1422	8,000 x 1	31 x 40	210.00
1424	10,000 x 1	31 x 40	225.00
1426	12,000 x 1	31 x 40	240.00

With Drop Lever and Notched Beam

No.	Capacity, lbs.	Platform, In.	Price.
1428	2,500 x $\frac{1}{2}$	23 x 32	\$125.00
1430	4,000 x $\frac{1}{2}$	31 x 40	160.00
1432	6,000 x $\frac{1}{2}$	31 x 40	185.00
1434	8,000 x 1	31 x 40	210.00
1436	10,000 x 1	31 x 40	225.00
1438	12,000 x 1	31 x 40	240.00

In figuring on complete Foundry equipments we make special prices on Foundry Scales.

All Kinds of Portable and Stationary Scales. Send for Special Catalogue.

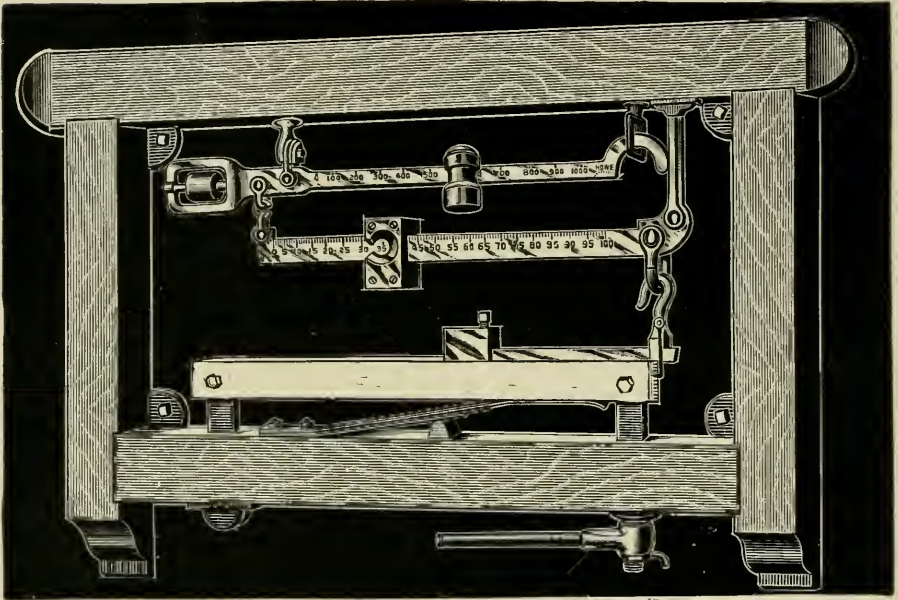
SPERRY TESTING MACHINE**For Showing Transverse Strength of Foundry Test Bars**

FIG. 404

**Deflection is
Shown**

**Results Can Be
Compared
with Pub-
lished Tables
Specimen Short
Enough to File**

**No Balancing
of Specimen
Required**

Space Required

Construction

It gives you the breaking strain and deflection of a one-inch-square specimen, one foot long, fixed at one end, weight applied to the other. This determination is standard. Your results may be compared with published tables. (See Haswell on Strength of Materials). No other low cost machine does this. The broken end of specimen is only about two and one-half inches long, and can be marked and filed away for future reference.

The specimen does not require balancing, as in other machines. The pressure applied can never be anything but the resistance of the specimen.

No floor space is occupied. A wall space of 70 x 42 inches is all that is required.

The machine frame is constructed of 6 x 6 timber, nicely molded and finished in hard oil. The scale beam is finely nickle plated, has no loose weights, and is made by the Howe Scale Co. As a whole, the machine is an ornament to your office or shop.

Price, \$150.00

These Machines in Stock

OBERMAYER'S SAND CRUSHER

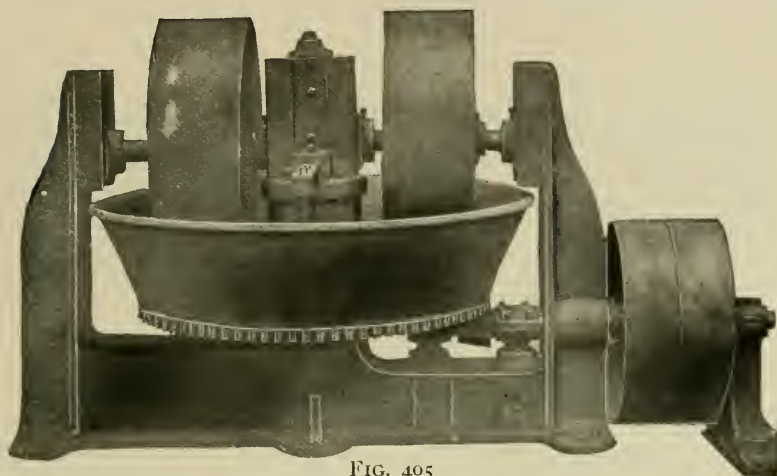


FIG. 405

Supplied with One or Two Rollers as Preferred

Pan, 5 feet in diameter. Rollers, 3 feet diameter by 12-inch face.
Weight of each roller, 1,200 pounds.

Floor space, 5 ft. x 8 ft. 6 in. for double machine.

" 5 ft. x 7 ft. 10 in. for single machine.

Price, single roll machine \$620.00

" double " \$800.00

The heaviest machine built for the purpose.

HORIZONTAL DRY MIXER

For Mixing All Kinds of Dry Material

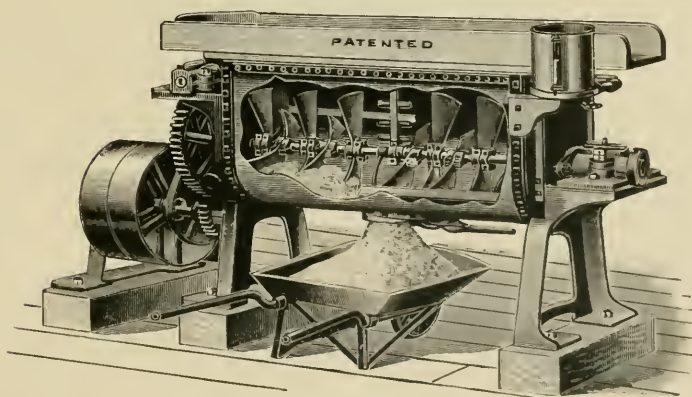


FIG. 405 1/2

Write for Further Information. See pages 238-248

AUTOMATIC MAGNETIC SEPARATOR

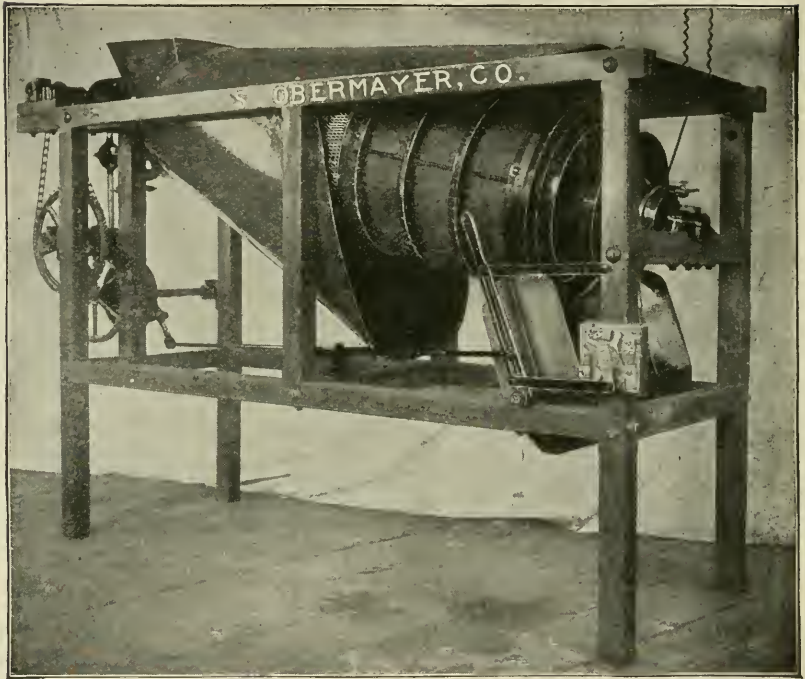


FIG. 406

This machine is used for saving shot iron from foundry refuse, cupola drop and slag. It is in use throughout the United States and Europe, and is without doubt a very practical machine. **Direct current** of electricity **necessary** to operate it.

It is easily set up and operated; requires little care and attention; can be moved easily from place to place; requires but little power to operate and takes but little electricity for the magnetic separation.

It is entirely automatic in operation after the material is thrown or conveyed into the hopper from the tumbling mills.

The machine ought to be set up in the tumbling room or adjoining it. When there is an exhaust in connection with the tumblers, it can be used on this machine, if desired, although the machine is made so that practically little dust escapes in operation.

By using this machine the spaces and holes in your tumbling or rattling boxes can be greatly enlarged; thus taking less time to rattle

the waste through and saving a certain amount of iron dust which is formed by too close tumbling.

It is durable and economical in operation, has large capacity and will pay for itself in a short time. Full directions supplied with each machine.

Dimensions, Weight, Capacity, Etc.

Size.	Dimensions Over All.			Speed, Revo- lutions per Minute	Horse Power Re- quired.	Size of Pulley.	Electricity Required.		Ship- ping Weight Lbs.	Capacity per Hour. Cubic Feet
	Length	Width.	Height				Volts.	Am- peres.		
Single Machine }	9' 3½"	3' 4"	4'	30	¼	20"x 3"	55	15	1600	40 to 50
							110	8		
							220	4		
							500	2		

Prices on application.

DYNAMO FOR OPERATING SEPARATOR

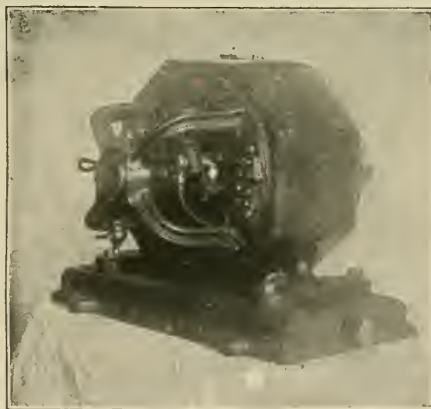


FIG. 406½

The above dynamo is the type we furnish to use in operating the machine when no electricity can be obtained. The cost of this dynamo is very small and it can be used, if desired, for other purposes when not in use in operating the separator.

DING'S MAGNETIC SEPARATOR

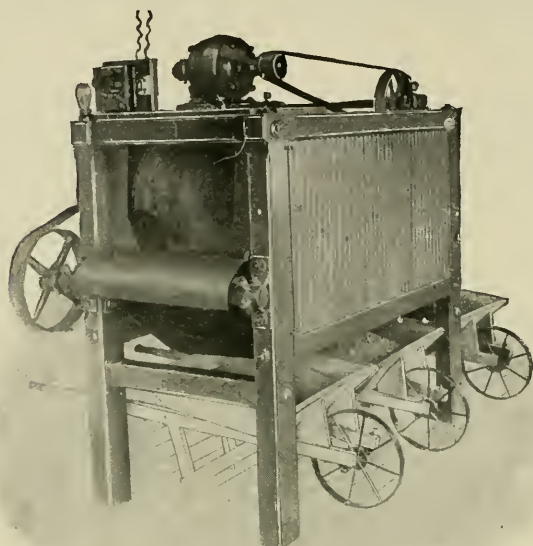


FIG. 407

Type O, Motor Driven

This Separator is especially adapted for recovering small particles of iron from cupola cinders and foundry refuse. Shipping weight, 1,500 pounds. Occupies a floor space 3 x 8 feet. Speed, 72 revolutions per minute. Driving pulley, 12 inches in diameter. Can be ordered for any direct current up to 500 volts. Electricity required to energize the magnets is about equal to that used in operating three ordinary 16-candle-power incandescent lamps. Mechanical power required, $\frac{1}{2}$ -horsepower. A switch and pilot lamp is furnished with every Separator.

The above cut shows the Separator with motor drive and wheelbarrows in position to receive the different separations—sand, coke and iron. It is one of the best machines of its kind on the market, and is just the thing for handling your cupola cinders, gangway scrapings, chipping room refuse and foundry offal. This machine will handle foundry refuse and crushed cupola cinders at the rate of 5,000 lbs. per hour; will handle stock containing very coarse material, such as brickbats, gaggers and large lumps of slag, coke, iron, etc. It delivers the iron free from dust and will handle any stock that is not unreasonably damp.

List price, f. o. b. factory \$400.00

List price, with motor \$500.00

For 500 volts add 10 percent to net price.

Discounts Given Upon Application

THE BLAKE PATENT CLIMAX CORE-WIRE STRAIGHTENER

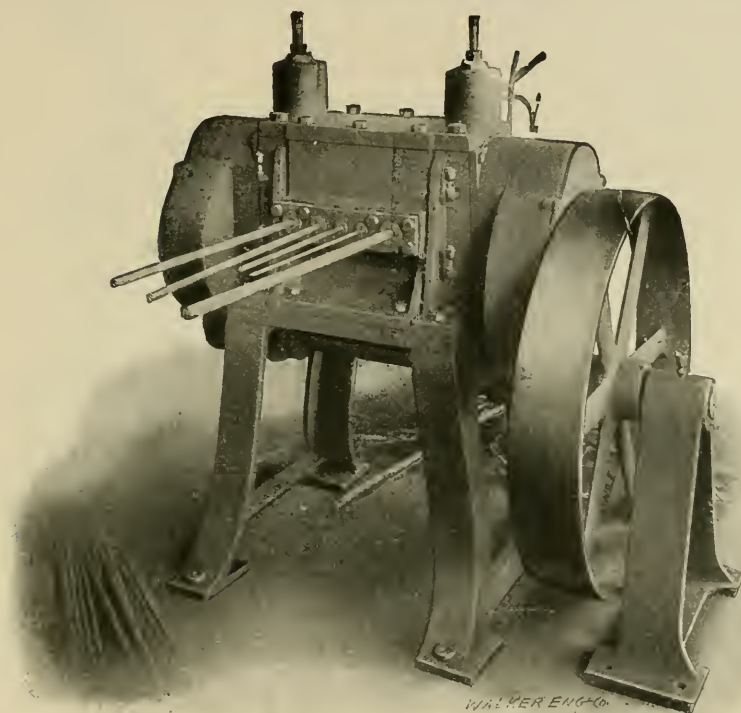


FIG. 408

(This illustration shows the rods emerging from the No. 3 machine all straightened and ready to use again.)

This is undoubtedly the greatest tool ever put into a foundry. As you know, core wire, after being used, is so twisted that it is usually sold for scrap. The cost of core wire is therefore a big item in every foundry. With our Climax Core-Wire Straightener it makes no difference how crooked the wires may be when they enter the machine, they will come out straight and ready to use again; consequently the core wires can be used over and over again and a great saving thereby effected. In any foundry having a large number of wires to straighten it will pay for itself in a short time.

No. 1 Machine. This machine will straighten wires $\frac{1}{16}$ inch, $\frac{1}{8}$ inch, and $\frac{3}{16}$ inch diameter. Weight, 150 lbs. Price, \$200.00.

No. 2 Machine. This machine will straighten wires $\frac{1}{16}$ inch, $\frac{1}{8}$ inch, $\frac{3}{16}$ inch, and $\frac{1}{4}$ inch diameter. Weight, about 200 lbs. Price, \$500.00.

No. 3 Machine. This is the machine illustrated above. It will straighten wires $\frac{1}{4}$ inch, $\frac{3}{8}$ inch, $\frac{1}{2}$ inch, $\frac{5}{8}$ inch, $\frac{3}{4}$ inch diameter. Weight, 1,700 lbs.

Price, \$700.00

Send for special circulars, with discounts.

IMPROVED WIRE CUTTER

We supply to the trade a Hand-Power Machine, such as is shown in illustration, which is used for cutting wire, the economy of which can readily be seen at a glance. The ordinary method of cutting wire in most shops is to use a chisel and hammer, while with this machine the wire is simply inserted and the lever pulled down, which readily cuts the wire. The wire cutter will cut wires from $\frac{5}{16}$ inch diam. to $\frac{17}{32}$ inch diam. and weighs 25 lbs.

Price, \$50.00

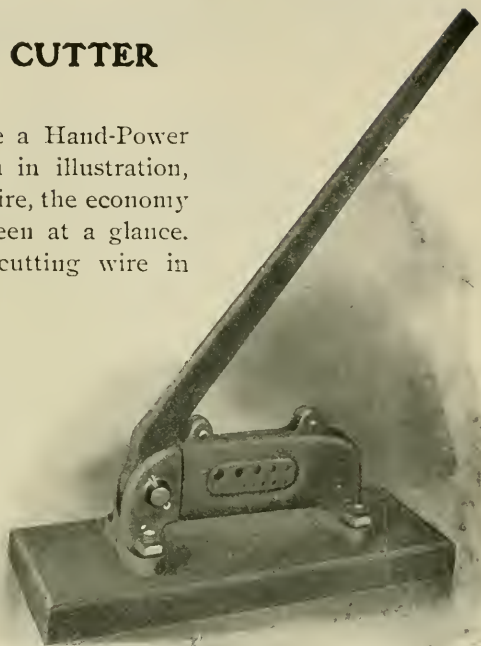


FIG. 409

OBERMAYER'S EASY CAR PUSHER

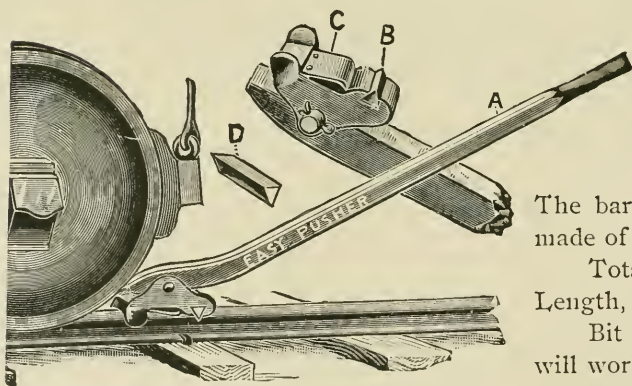


FIG. 410

More powerful than any team of horses or ten men.

It is strong and well constructed.

The bar, bit and spring are made of the finest steel.

Total weight, 20 lbs.
Length, $5\frac{1}{2}$ feet.

Bit can be inverted. It will work on any track and under any brake.

Sent on 10 days' trial to responsible parties.
We carry them in stock and can ship immediately.

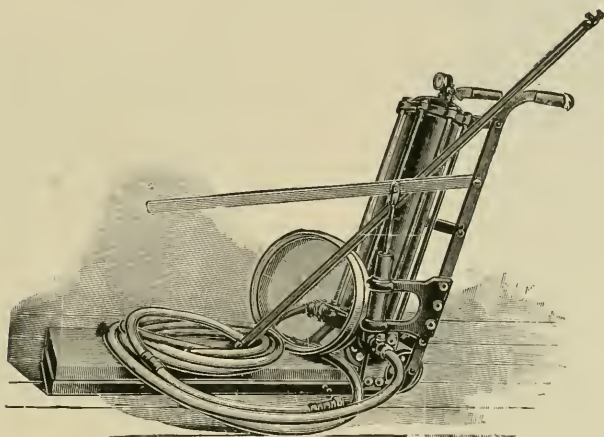
OBERMAYER'S WHITEWASHING MACHINE

FIG. 411

This is the largest and best machine ever invented or manufactured for Whitewashing, Calcimining or cold water Paints. One man operating this machine can do the work of ten men with the brush. It consists of a strong riveted steel tank 8 inches in diameter and about 36 inches long, strengthened by 6 long steel bolts. The pump barrel and all valves are composed of best rolled gun metal. All passages can be easily cleaned, and the nozzles are the result of a long experience, and are made regardless of the initial cost. Factories can arrange at small cost perfect sanitation, good light and cleanliness.

Capacity from 20 to 60 square feet per minute.

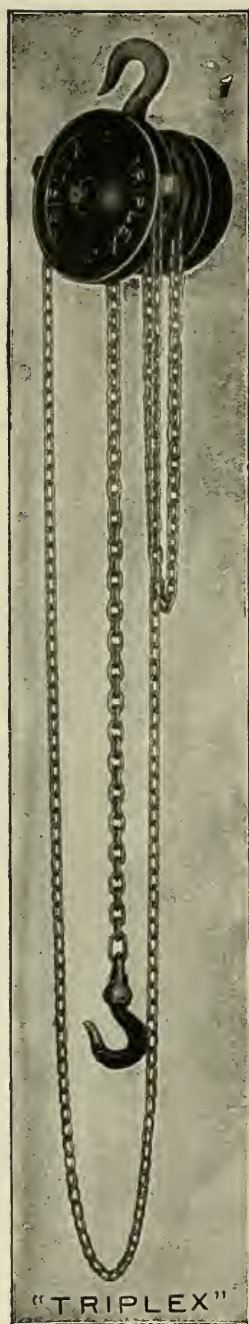
For large mold and loam work this machine will spray the blacking if the material is carefully strained before using it.

We supply with this machine 25 feet delivery hose, 12½ feet of suction hose, 3 different nozzles, circular strainer, unions, cocks, all complete.

Price, \$150.00

Extra hose, 60 cents per foot.

Net weight, 185 pounds. Gross weight, 300 pounds.



THE YALE AND TOWNE TRIPLEX BLOCK

For Constant Use and Best Economy

The great saving of time and labor effected by the Triplex Block is accomplished by separating the sustaining mechanism from the hoisting gear; thus decreasing the time, labor and wear one-half, both in hoisting and in lowering. The power is transmitted through a balanced train of spur gears, which gives this block an efficiency nearly double that of other types, and permits, both in hoisting and in lowering of the smooth and free operation required in foundry work.

The newest and best equipped foundries are now using Triplex Blocks because of their great saving in time and labor. This block is particularly suitable for use on jib cranes, light travelers and overhead trolleys.

Capacity in Tons.	Price Complete.	Regular Hoist in Feet.	Reach in Feet and Inches.	Extra Hoist, Price per Ft.	Min. Distance between Hooks in In.	Net Weight in Lbs.	Chain Pull in Lbs. to Lift Full Load.	Feet of Chain Handled to Lift Load 1 Ft.
1/2	\$35 00	8	9 ft. 3 in.	\$0 90	15	51	62	21
1	45 00	8	9 ft. 5 in.	95	17	89	82	31
1 1/2	60 00	8	9 ft. 7 1/2 in.	1 00	19 1/2	133	110	35
2	70 00	9	11 ft. 0 in.	1 05	24	203	120	42
3	90 00	10	12 ft. 8 in.	1 50	32	206	114	69
4	110 00	10	13 ft. 1 in.	1 60	37	307	124	84
5	140 00	12	15 ft. 9 in.	2 15	43	397	110	126
6	165 00	12	15 ft. 10 in.	2 15	46	417	130	126
8	200 00	12	16 ft. 3 in.	2 70	51	505	135	168
10	240 00	12	16 ft. 9 in.	3 25	57	622	140	210
12	300 00	12	16 ft. 9 in.	4 30	57	800	260	126
16	360 00	12	17 ft. 1 in.	5 40	61	1000	270	168
20	425 00	12	18 ft. 5 in.	6 50	77	1150	280	210

Other Makes Furnished if Desired

Let Us Quote You

FIG. 412

BROWN PATENT STEEL TROLLEYS

Combined With Yale and Towne Triplex Chain Blocks

For Use on Standard I-Beams Affording One of the Most Economical and Efficient Methods of Handling Material in the Foundry and Machine Shop



FIG. 413

**Capacity One-half to Two Tons
with Clevis Connection**

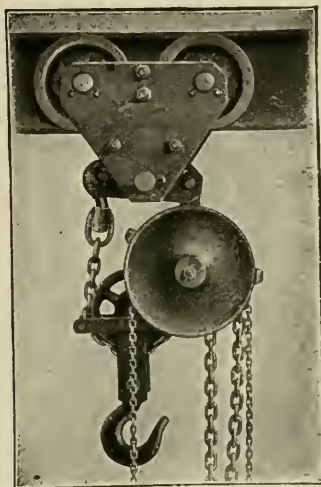


FIG. 414

**Capacity Three to Ten Tons
with Clevis Connection**

These Trolleys have four truck wheels, each fastened on a steel axle which revolves in a pair of self-adjusting bronze bearings. The frame is of steel, with inner plates to carry the inside bearings which steady the wheels and reduce the resistance to motion. The self-oiling double bearings are equipped with proper receptacles for holding a six months' supply of oil, and the wheels are made almost as large in diameter as the depth of the I-beam thereby insuring durability and easy running.

Capacity in Tons.	Standard Sizes of I-Beams in Inches.	Regular Hoist in Feet.	With Hook Connection		With Clevis Connection.		Price of Trolley Without Block for Hook Con- nection.
			Triplex Block and Trolley.	Minimum dis- tance in inches, bottom of I-beam to inside of lower Hook of Block.	Addi- tional Price.	Minimum dis- tance from bottom of I-beam to inside of lower Hook.	
1/2	5	8	\$ 65 00	20	\$10 00	13	\$ 30 00
1	6	8	80 00	23	10 00	17	35 00
1 1/2	7	8	100 00	26	10 00	20	40 00
2	8	9	115 00	32	10 00	21	45 00
3	9	10	140 00	40	20 00	34	60 00
4	10	10	175 00	45	25 00	38	80 00
5	12	12	220 00	55	25 00	41	100 00
6	15	12	265 00	56	30 00	41	120 00
8	20	12	325 00	63	30 00	48	150 00
10	24	12	395 00	71	30 00	48	180 00

Immediate Shipments made on Standard Sizes

OVERHEAD CARRYING SYSTEMS

For Foundries, Machine Shops, Manufacturing Establishments, Warehouses, etc. Can be attached to any style of overhead support. Will save you from 25 to 60 percent on the cost of handling the products of your plant.

Four Wheel Swivel Carrier No. 27

Made to run in our No. 131 Trolley Track. Especially designed for use in systems where Curved Sections of Track are used.

Maximum carrying capacity 300 lbs.

Price \$8.00

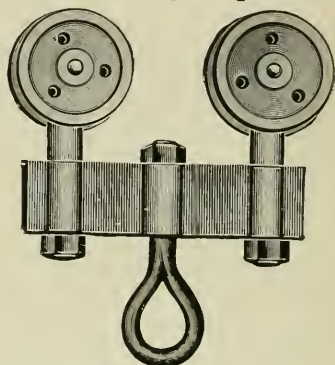


FIG. 415

Eight Wheel Swivel Carrier

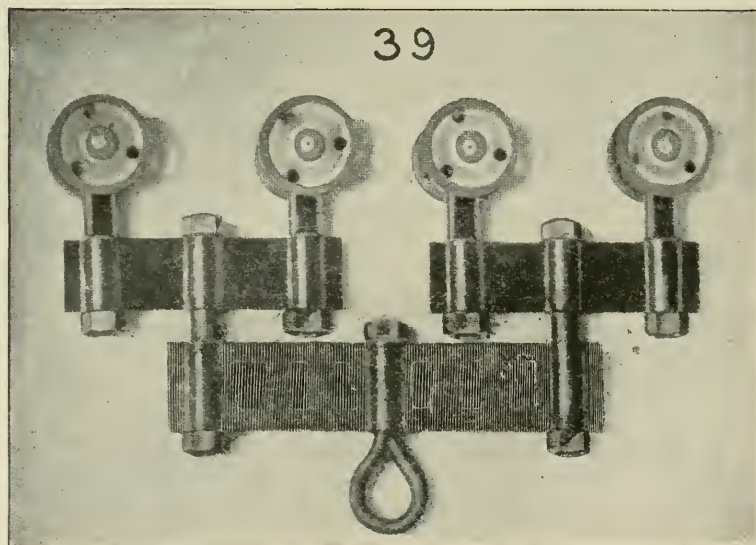


FIG. 416

Especially designed for use in systems where Curved Sections of Track are used. Made in two sizes:

No. 39 Carrier for No. 133 Track.
Maximum carrying capacity 3000 lbs.

Price \$24.00

No. 39½ Carrier for No. 133 Track.
Maximum carrying capacity 1000 lbs.

Price \$8.00

Inquiries for estimates should be accompanied by sketch showing requirements, also statement of maximum loads to be carried.

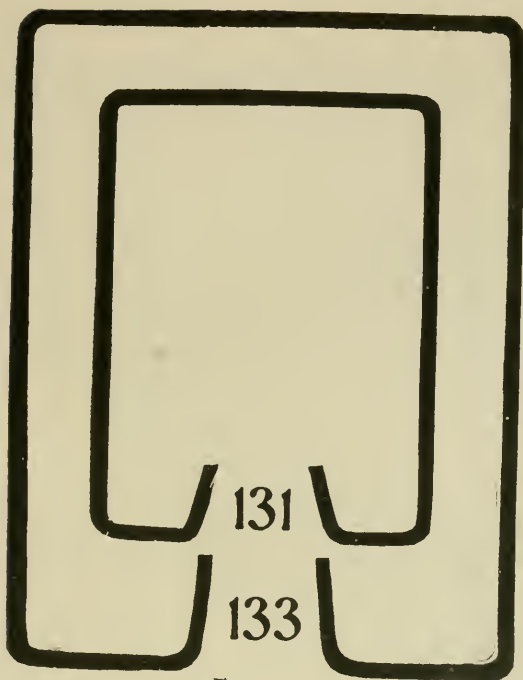


FIG. 417

The adjoining cut shows full size cross section of our Overhead Trolley Tracks.

No. 131

Suitable for loads up to 1000 lbs.

Made of 16 gauge steel.

Any quantity furnished in any length up to 10 ft. sections.

Curved Sections of Track furnished in any radius over 18 in.

Straight Track \$1.00 per ft.
Curved Track \$3.00 per ft.

No. 133

Suitable for loads up to 8,000 lbs.

Made of 10, 11, 12, 13 gauge steel.

Any quantity furnished in any length up to 10 ft. sections.

Curved Sections of Track furnished in any radius over 18 in.

Straight Track \$1.50 per ft.

Curved Track 5.00 per ft.

This cut shows the style of Brackets used in attaching Track to superstructure.

No. 42 is an End Bracket with a blind that prevents the carrier from running off.

Nos. 41, 42, 45 and 46 used with No. 133 track . . \$1.20 each

Nos. 57, 58, 59 and 60 used with No. 131 track . . \$0.50 each

Special Brackets furnished if required.

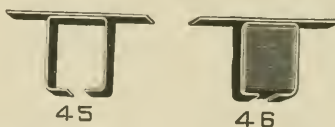
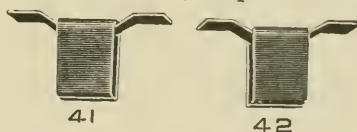


FIG. 418

OVERHEAD TROLLEY SYSTEM

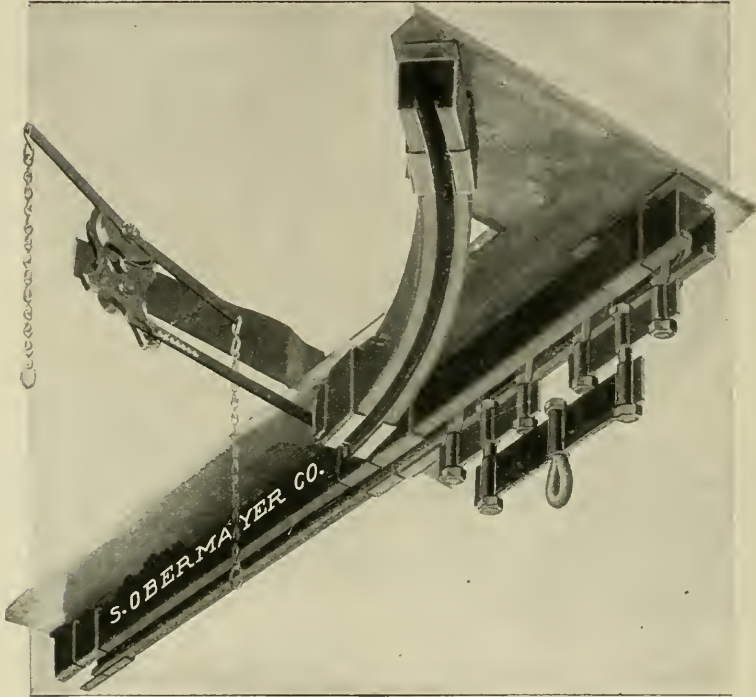


FIG. 419

Above cut shows a section of Straight and Curved Carrying Track, with two-way Switch in connection. Also an eight wheel Swivel Carrier, No. 39.

Switch is fitted with a positive lock and requires no attention after it is once adjusted.

Price List

2-way Switch for No. 131 Track	\$40.00
3 " " 131 "	48.00
2 " " 133 "	56.00
3 " " 133 "	64.00

Investigate Our Duplex and Triplex Chain Blocks



Carrying System —A complete descriptive catalogue of Carrying Systems furnished on application.

SCREW AND HYDRAULIC JACKS

(Patented Lever, Gêared Lever.)

The Most Simple, Durable, Powerful and the Safest Operating Jacks in the World

No. 101 Bell Base Jack

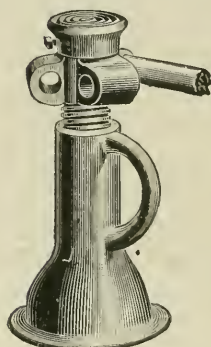


FIG. 420

Capacity, 8 tons.
Weight, 23 lbs.
Diameter of screw, 2 in.
Rise, $4\frac{1}{2}$ in.
Height when down, 10 in.

Made in larger sizes.

No. 14 Double Movement Truck Box Screw Jack

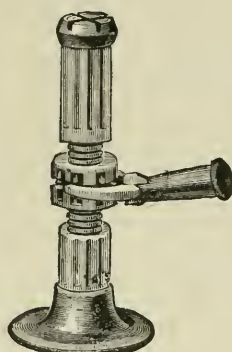


FIG. 421

Capacity, 8 tons.
Weight, 25 lbs.
Diameter of screw, 2 in.
Rise of screw, 7 in.
Height of Jack when down, 13 in.

No. 4 Jack

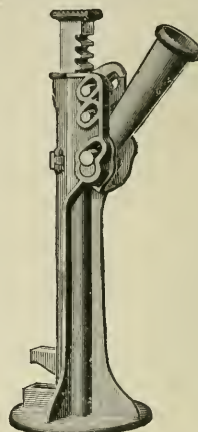


FIG. 422

A Good Railroad Jack

Capacity, 4 tons.
Weight, 46 lbs.
Size of bar square, $1\frac{1}{2}$ in.
Rise of bar, 14 in.
Height when down, $22\frac{1}{2}$ in.

Broad Base Hydraulic Jack

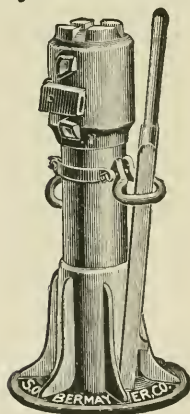


FIG. 423

Capacities, 4, 7, 10, 15, 20, 30 and 40 tons.
Heights when closed, from 2 to $3\frac{1}{2}$ ft.
Different sizes weigh from 60 to 300 lbs. each.
Adjusts from 12 to 24 in., according to size

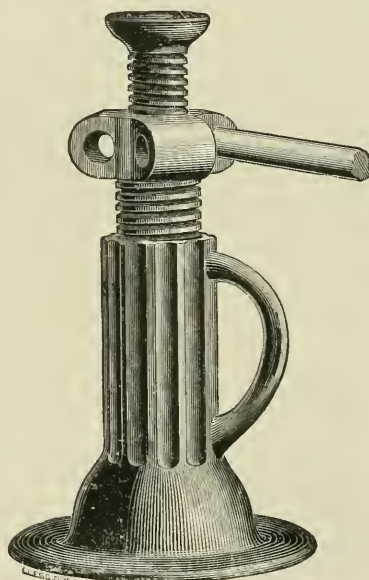


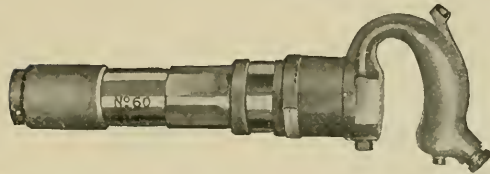
FIG. 424

Telescope Screw Jack

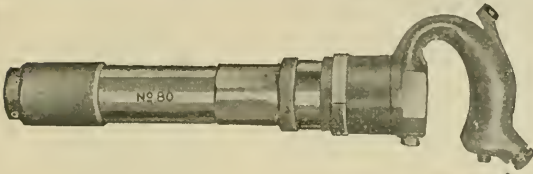
Base, mal. iron;
screw, cast steel.
Interior screw,
high grade machine steel.
Made in four sizes.
Can be furnished with spring ratchets at extra cost.

Operates Twice as Rapidly as the Single Screw Jacks

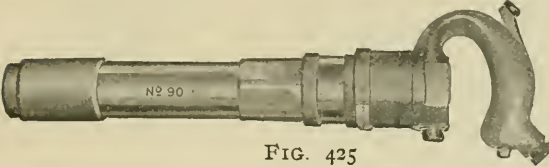
Prices on Application

BOYER LONG STROKE RIVETING HAMMERS**Durable—Powerful—Efficient****No. 60
Riveting Hammer**

Weight, 22 pounds;
6-inch stroke; capacity
up to $\frac{7}{8}$ -inch rivets.

**No. 80
Riveting Hammer**

Weight, 23 pounds;
8-inch stroke; capacity
up to $1\frac{1}{8}$ -inch rivets.

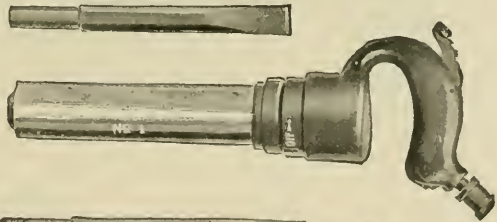
**No. 90
Riveting Hammer**

Weight, 25 pounds;
9-inch stroke; capacity
up to $1\frac{1}{4}$ -inch rivets.

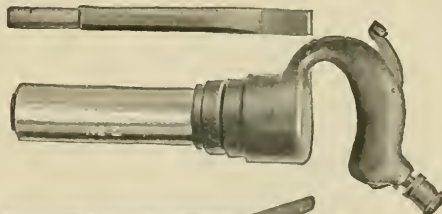
FIG. 425

BOYER CHIPPING, CALKING AND BEADING HAMMERS**No Vibration or Delicate Parts****No. 1**

For heavy chipping and
calking, and light riveting;
weight, $11\frac{1}{2}$ pounds.

**No. 2**

For medium calking and
chipping; weight, $10\frac{1}{2}$ pounds.

**No. 3**

For light chipping, calk-
ing, and flue beading; weight,
 $9\frac{3}{4}$ pounds.

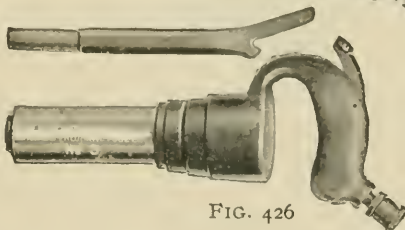


FIG. 426

We handle the Boyer Pneumatic Stone Hammers, made in sizes suitable for every variety of work, fitted with either pistol grip or straight handle.

PNEUMATIC TOOLS

Little Giant and Boyer Pneumatic Piston Air Drills, Reversible Flue Rolling, Reaming and Tapping Machines.

Built in sizes suitable for every variety of work. Simpler in construction, more economical, and they have given better satisfaction than any other machines of similar character on the market.

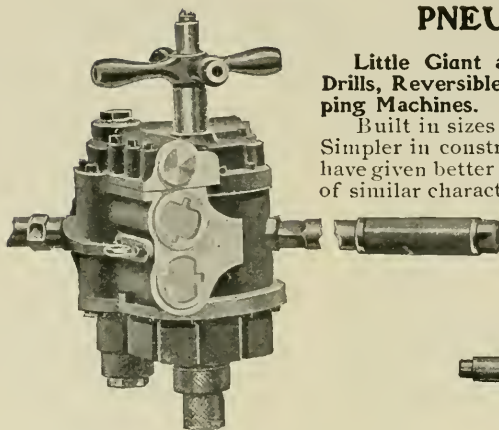


FIG. 427

Little Giant Drill No. 0

Weight, 55 lbs. Adapted for boring cylinders and extra heavy drilling, reaming and tapping.

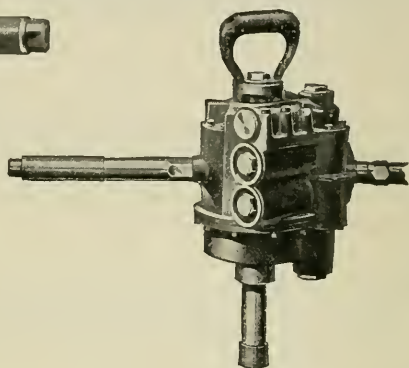


FIG. 428

Little Giant Reversible Flue Rolling, Reaming and Tapping Machine No. 11

Weight, 35 lbs. Adapted for rolling flues up to 3 inches in diameter and reaming and tapping up to 2 inches in diameter.

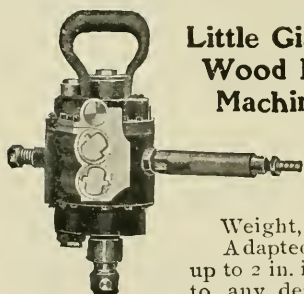


FIG. 429

Little Giant Wood Boring Machine No. 5

Weight, 14 lbs. Adapted for boring up to 2 in. in diameter to any depth in all kinds of wood.

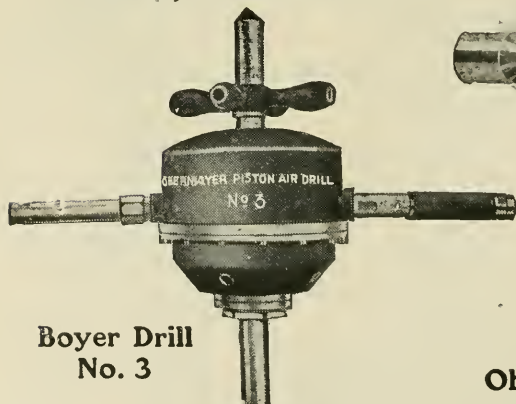


FIG. 430

Boyer Drill No. 3

Weight, 35 lbs. Adapted for drilling up to 2 inches in diameter and reaming and tapping up to 1½ inches in diameter.

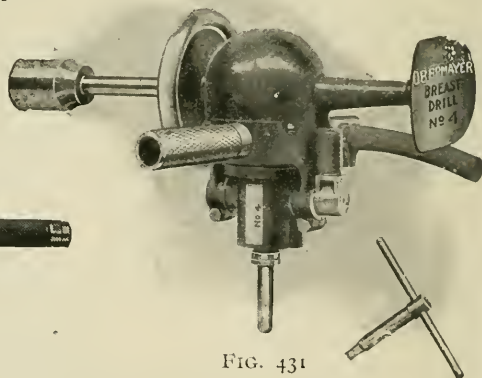


FIG. 431

Obermayer Breast Drill No. 4

Weight, 8 lbs. Adapted for drilling up to 5/16 inch in diameter. This machine is of the oscillating piston type and is particularly adapted for drilling telltale holes in staybolts.

AIR MOTOR CHAIN HOISTS

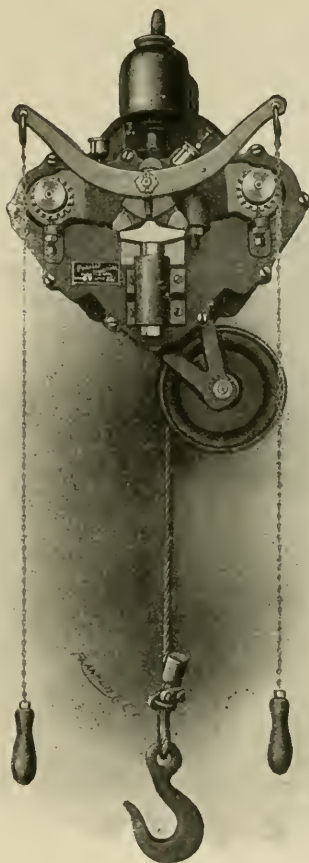


FIG. 432

1 1/2-Ton Motor Hoist
(Single Strand, Quick Lift)

Portable Motor Hoists

We build these hoists in 6 different sizes, as shown below. Each hoist will be furnished with automatic brake, if desired, and is tested before leaving the factory.

These hoists are so built that, if desired, they can be operated by steam instead of air, **if we are notified** before the motors leave the shop.

No.	Capacity	Height of Lift	Distance Between Hooks	Weight
1	1 1/2 tons	10 feet	30 inches	160 lbs.
2	2 1/2 "	10 "	37 "	230 "
4	4 1/2 "	10 "	40 "	400 "
6	6 1/2 "	10 "	.....	600 "
8	8 1/2 "	10 "	.....	720 "
10	10 1/2 "	10 "	.....	800 "

Extra height of lift can be obtained at a small additional cost.

AIR MOTOR CHAIN HOISTS

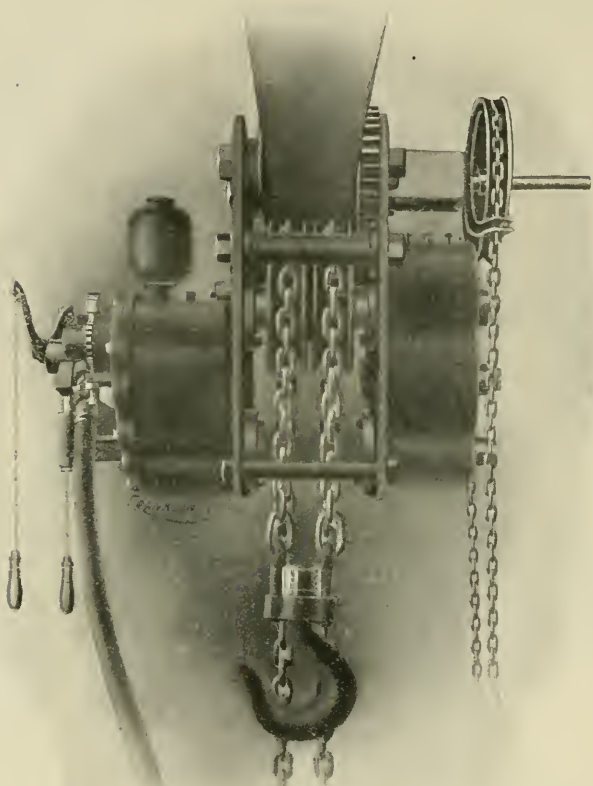


FIG. 433

Combined Trolley and Hoist on I Beam

Stationary Motors

These motors can be used for a large number of purposes, and we build them in six different sizes. As in the case of motor hoists, these motors can be operated by steam instead of air.

No.	H. P.	Outside Dimensions	Cylinders	
			Diam.	Stroke
1	1½	15 in. x 12 in. x 12 in.	2¼ in.	2¼ in.
2	2½	15 in. x 15 in. x 12 in.	2½ in.	2½ in.
4	4½	18 in. x 18 in. x 13 in.	3½ in.	2⅝ in.
6	6½	.....	.....	.....
8	8	.....	.....	.....

Prices on Application

AIR HOISTS

The perfection we have attained in the manufacture of Standard and Special Air Hoists is the result of many years' experience and great expense in developing the particular features which make them the most efficient and reliable on the market.

Cylinders for hoists three inches to six and one-half inches diameter inclusive, are of seamless drawn brass tubings, polished inside. Hoists seven inches to twenty-four inches are *cast iron* carefully molded, accurately bored with special tools, insuring uniform diameter and smooth finish from end to end. Seven and seven and three-quarter inch hoists are also made with *brass tube* cylinders and six inch with cast iron cylinders.

Heads may be easily removed and are *in no case screwed on* and thus permit the utmost facility in the inspection of interior of hoist. **Lugs on top head** with pin afford safe and convenient means of attaching hoist to support.

Piston packing is made of carefully selected leather (the least scar or grub hole being cause for rejection) and is fitted so as to hold air perfectly.

Gland is brass casting and set up with ordinary wrench.

Air Supply is taken at top of hoist and conveyed to valve at bottom head through pipe of proper size.

All Hoists are thoroughly tested and known to be in perfect working order before shipment. For foreign shipment, all sizes are completely enclosed in substantial box. Shipping weights given on page No. 317.

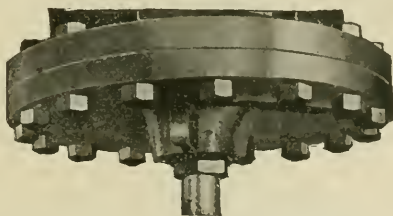


FIG. 434
Bottom Head



FIG. 435
Top Head With Lugs

TYPE "A" AIR HOISTS

Special Features

Valve is provided with **Automatic Oiler**.

Adjustable Speed Regulator permits valve to be set for all speeds ; independent adjustment for raising and lowering.

Safety Check prevents load falling suddenly in case of break in supply hose.

Exhaust from valve is carried to top and so arranged that only pure air from the compressor can be admitted to cylinder in lowering process. Keeps out grit and dust and saves the packing.

Automatic Cut-Off closes valve at any desired height or lift without attention from operator. The point of cut-off is fixed by position of **Clamp Collar** on piston rod; this collar is clamped on and rod can not be marred.

The Top Safety Check prevents piston from flying up in case load should become detached. Any unusual pressure of exhaust automatically closes opening and air remaining in cylinder checks upward motion of piston.

Swivel Hook has both **rotating** and **swinging** movements.

Type "A" Hoist equipped with special features is suitable for the most delicate work, and with the exception of hoist fitted with our Mason Automatic Valve, described on page 316, is the most sensitive hoist made.

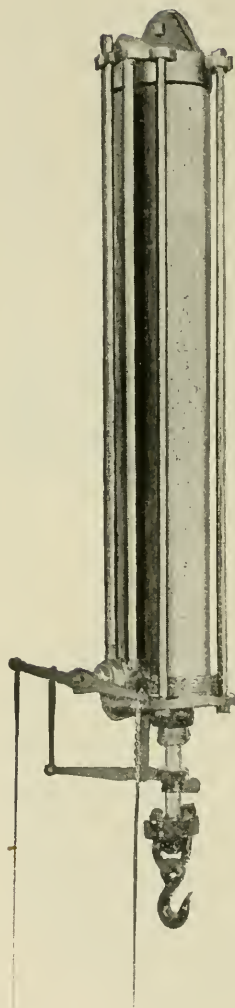


FIG. 436

Type "A" Hoist with Brass Cylinder 3 inches to 6 inches Diameter

TYPE "B" AIR HOISTS

Type "B" hoists have the same designs of cylinders, pistons and other vital parts as in Type "A."

Valve has **automatic oiler**. **Exhausts direct**.

Hook is forged on end of piston rod, which reduces the length of the hoist to the minimum.

The special attachments of Type "A" hoists may be supplied at additional prices as listed below :

Swivel hook	\$2.00
Type "A" valve with speed regulator and safety check	2.00
Automatic cut-off	4.00
Exhaust attachment	2.00

Add amounts for items wanted to quotations for standard Type "B" hoist.

Write for further information.

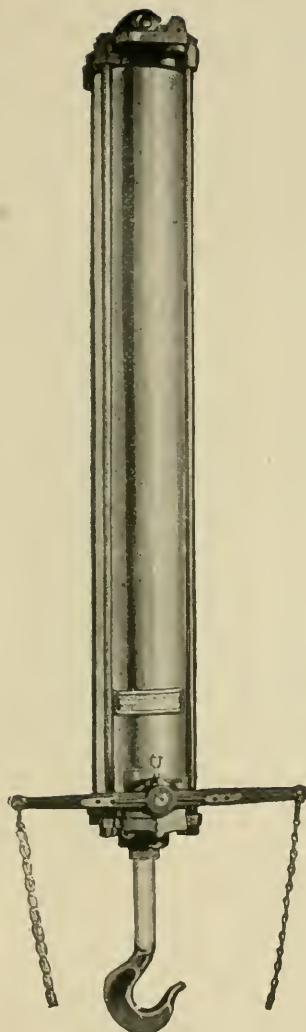


FIG. 437

**Type "B" Hoist with Brass
Cylinder from 3 to 6
inches Diameter**

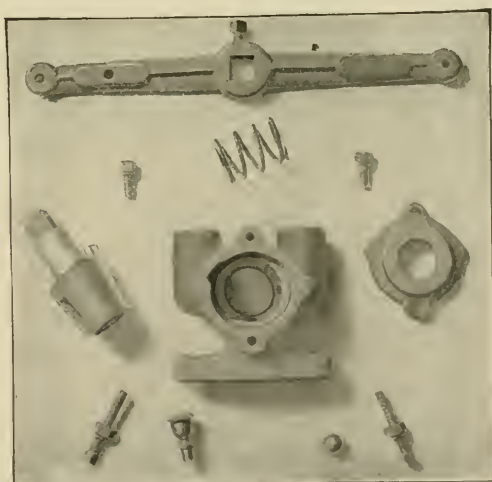


FIG. 438

Valve Parts

Valve embodies every essential feature.

Few parts, accurately machined, automatic adjustment for wear, automatic lubrication.

This Valve is the Most Satisfactory on the Market

MASON AUTOMATIC VALVE

Patented 1898

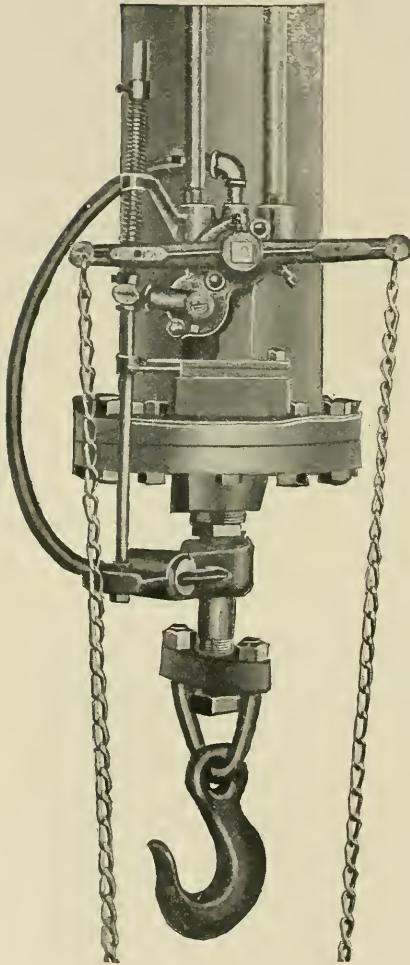


FIG. 439

Mason Automatic Valve

Load positively sustained at any point.
When load is raised and main valve closed, air passes through hose (shown in cut) and clamps auxiliary valve lever to piston rod, the slightest movement of which automatically operates auxiliary valve and makes compensation in air pressure.

It stands unequaled in design, workmanship and efficiency. It is invaluable in foundries, machine and boiler shops, in packing plants, at punch, shears and wherever necessary to sustain loads for any length of time without variation in position. Can be applied on type "A" hoist **without automatic cut-off** and on special type "B."

Spring Closing Device

As illustrated, furnished when specially ordered. Closes valve instantly when released and prevents waste of air.

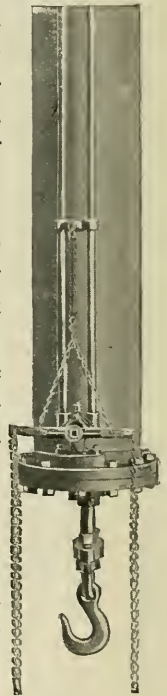


FIG. 440

Spring Closing Device

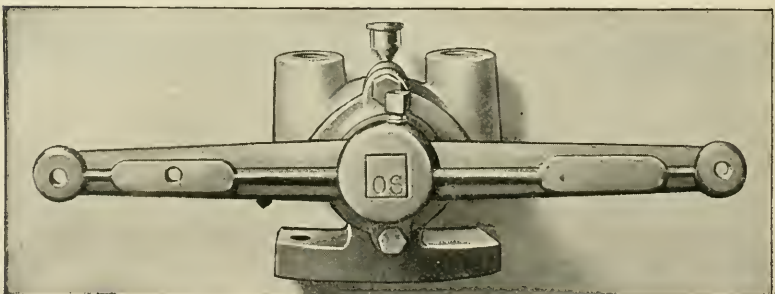


FIG. 441—Our Regular Valve Complete

CYLINDER AIR HOISTS

The table below gives standard sizes with capacities and other data. The capacity varies in proportion to the pressure—the quantity of free air is directly proportional to the load.

Factor of safety allowed is ample for all sizes for the maximum rated capacity.

Table of Sizes

	Sizes	Capacities.	Add to Stroke to get Shortest Distance between Bearing Points of Hooks		Approximate Net Amount of Free Air Used in One Four-Foot Lift.	Approximate Shipping Weights of Hoists for Home and Foreign Shipment	
	Inside Diam. of Cylinder	Nominal Lifting Capacity in lbs. at Air Pressure of from 60 to 100 lbs.			In Cubic Feet.	Standard Hoists, ft Stroke Lbs.	Add for each add'l 12 inches of Stroke, Lbs.
			Type A	Type B			
Cast Iron Cylinders	3 1/4 in.	350 to 600	20 in.	11 1/2 in.	1.2 to 2.	110	10
	4 "	650 to 1,100	18 "	10 3/4 "	1.4 to 2.6	120	15
	5 "	1,000 to 1,700	18 "	10 3/4 "	2.7 to 4.2	150	20
	6 "	1,500 to 2,500	20 5/8 "	12 1/8 "	3.9 to 5.9	175	25
	6 1/2 "	1,700 to 2,800	20 5/8 "	12 1/8 "	4.6 to 7.	190	28
	7 "	2,000 to 3,300	21 3/4 "	13 1/4 "	5.5 to 8.	200	30
	7 3/4 "	2,300 to 4,000	23 3/4 "	14 1/2 "	6. to 9.2	220	35
	8 "	1,500 to 2,500	20 5/8 "	12 1/8 "	3.9 to 5.9	425	40
	7 "	2,000 to 3,300	21 3/4 "	13 1/4 "	5.5 to 8.	475	60
	8 "	2,500 to 4,500	23 1/4 "	14 7/8 "	7. to 10.8	625	100
	9 "	3,500 to 5,500	25 1/2 "	16 1/2 "	8.5 to 13.	700	110
	10 "	4,000 to 7,000	26 "	17 1/4 "	11.2 to 17.1	775	120
	12 "	6,000 to 10,000	26 3/4 "	18 "	15.4 to 23.6	1,000	145
	14 "	8,000 to 13,000	30 1/4 "	19 7/8 "	21.3 to 32.8	1,200	160
	16 "	10,000 to 18,000	31 1/4 "	28 1/4 "	27.9 to 42.2	1,650	175
	18 "	12,000 to 23,000	39 1/4 "	34 3/4 "	35.4 to 54.3	1,900	200
Brass Cylinders	20 "	16,000 to 28,000	41 3/4 "	37 1/4 "	42.2 to 65.6	2,300	250
	24 "	24,000 to 40,000	42 "	38 "	62.6 to 96.	3,250	300

Hoists with lifts from 4 feet to 8 feet are standard sizes ordinarily used.

Horizontal, telescopic, compound hoists, etc., at special prices.

Prices on Request

HOSE TROLLEYS

Prices Quoted on Request on Hose, Hose Trolleys, Wire and End Connections
or Tracks. Simplest Construction. Best Results

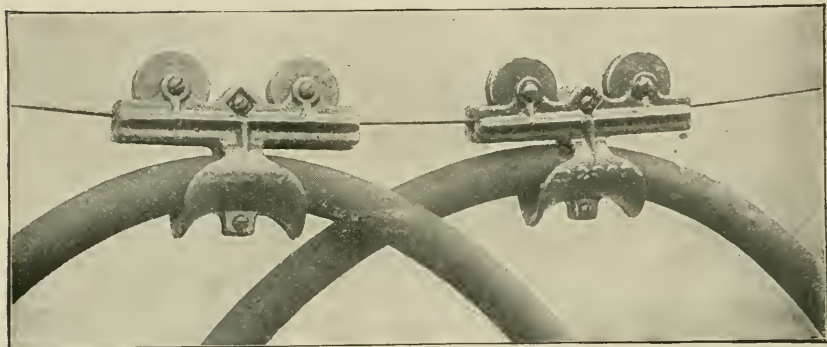


FIG. 442. Standard Hose Trolley.

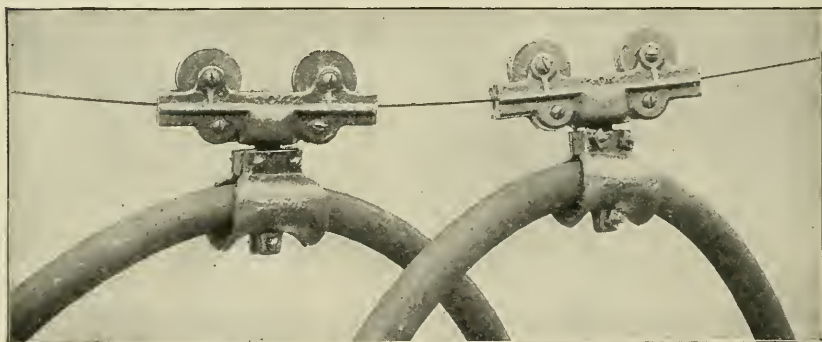


FIG. 443. Hose Trolley, Swivel Type

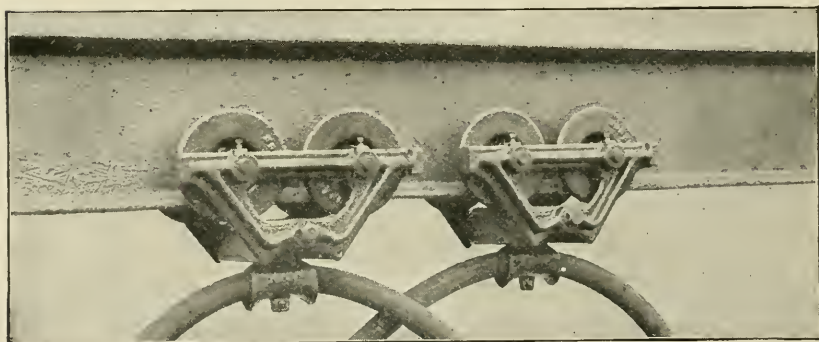


FIG. 444. "I" Beam Hose Trolley

AIR RECEIVERS

Air Receivers are made for 110 Pounds Working Pressure

Construction throughout is of best steel plate with flange steel heads.

All receivers are subjected to a test of 150 pounds hydrostatic pressure before shipment.

They are equipped with **Safety Valve**, **Flanges** for **Inlet** and **Discharge** pipes, **Pressure Gauge** and **Drain Cocks**.

The Following are Standard Sizes

No.	Size		Capacity Cubic Feet	Diameter Inlet and Outlet Pipes	Diameter Safety Valve
	Diameter	Height			
1	26 in.	3 ft. 6 in.	12	1½ in.	1 in.
2	30 "	6 " 0 "	30	2 "	1½ "
3	36 "	6 " 0 "	42	2 "	1½ "
4	36 "	8 " 0 "	56	2½ "	2 "
5	42 "	8 " 0 "	76	3 "	2 "
6	42 "	10 " 0 "	96	4 "	2½ "
7	48 "	12 " 0 "	150	5 "	2½ "

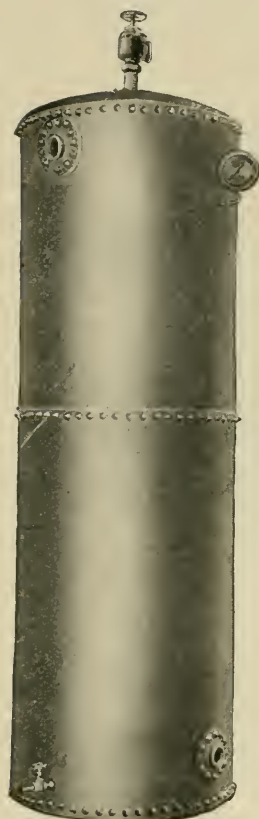


FIG. 445

They may be either vertical or horizontal. The vertical type will be furnished unless otherwise specified.

HORIZONTAL HOIST

Horizontal hoists are designed for locations where there is not sufficient head room for vertical hoists or where they are more easily supported in this position.

Air hoists may be applied to existing cranes by purchaser and are furnished with brackets for attachment to frame in any position, with this idea in view.

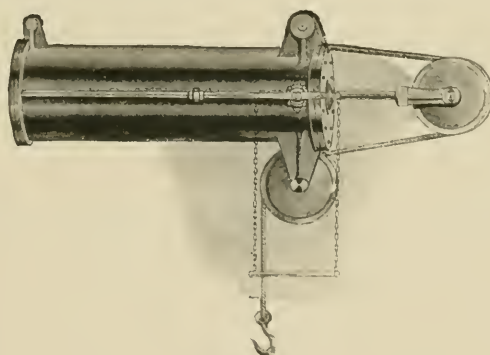


FIG. 446

STANDARD AUTOMATIC COMPRESSORS

Single Stage

Single Acting

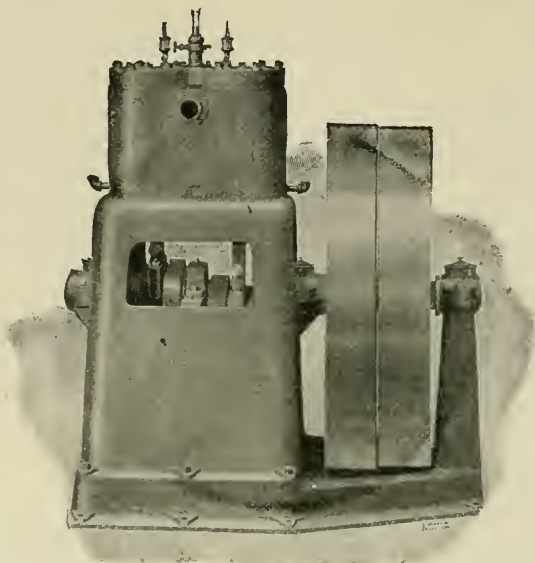


FIG. 447

Table of Standard Automatic Compressors

Actual capacity of machine in cub. ft. of free air per min. at speed given.	Size of Air Cylinder	Pressure designed for in pounds	Revolutions per minute.	Theor'l capacity per 1 revolution	Floor space, inches.	Max. height above floor.	Size of pulleys or steam cylinder in inches.	Suction pipe.	Discharge pipe.	Approximate Horse Power required at listed capacity.				Shipping weights.	
										40 pds.	60 pds.	80 pds.	100 pds.	Domest.	Foreign.
Belt-Driven, Single Stage															
25	6 x 6	50-80	140	.196	32x38	3'-9"	32x6	2	1 1/4	3.1	3.8	4.5	5.0	1,260	1,410
25	{ 6 x 6 8 x 8	80-100	140	.196	32x47	4'-4"	32x6	2	1 1/4	3.1	3.8	4.5	5.0	1,450	1,720
50		50-80	125	.456	44x54	5'-0"	44x8	2 1/2	1 1/2	6.2	7.8	9.0	10.0	2,675	2,900
50	{ 8 x 8 9 x 9	80-110	125	.456	44x65	5'-8"	44x8	2 1/2	1 1/2	6.2	7.8	9.0	10.0	3,325	3,710
75		50-80	125	.662	52x	5'-4"	52x9	3	2	9.3	11.7	13.6	15.0	3,300	3,700
75	{ 9 x 9 8 x 12	80-110	125	.662	52x	6'-4"	52x9	3	2	9.3	11.7	13.6	15.0	4,100	4,600
75		90-110	120	.70	60x72	7'-4"	60x10	3 1/2	2	...	19.5	13.6	15.0	6,200	7,120
125	10 x 12	70-90	120	1.09	60x72	7'-4"	60x10	4	2	...	...	22.5	24.5	6,400	7,400
200	13 x 12	25-40	120	1.84	60x72	7'-4"	60x10	5	2 1/2	24.5	...	...	...	6,600	7,600
Belt-Driven, Double Stage															
100	13- 8 x 12	90-110	120	.92	60x72	7'-4"	60x10	3 1/2	2	...	...	17.0	18.5	6,600	7,230
200	16-10 x 16	90-110	120	1.86	66x92	8'-7"	66x15	5	2 1/2	...	...	34.0	37.0	9,800	11,400

CURTIS COMPRESSORS—SINGLE STAGE

6 x 6 Inches and 8 x 8 Inches and Larger Sizes

We recommend one of our Standard Single-Acting and Single Stage Compressors of the two sizes, viz., with cylinders 6 x 6 inches, and 8 x 8 inches, and of capacities respectively of 25 and 50 cubic feet per minute. These Compressors are remarkable for their extreme simplicity in that they are single-acting, self-oiling, and built so as to eliminate stuffing boxes and cross-heads.

The crank shaft is made of steel and runs in chain oiling boxes. Connecting rods have removable phosphor bronze bushings at the upper wrist pin, and have standard marine crank ends.

The water jackets completely surround the cylinders, cylinder heads and valve cases. As the pistons are of the trunk pattern and to some extent self-cooling, we are enabled to secure 80 percent more cooling surface than is possible with any double-acting type.

The valves are of the poppet gravity type and work without springs. The valves and governor are in the same case and are not built into the machine itself. The governor is automatic in its action, and will maintain a desired pressure in the reservoir very closely. This governor does not stop the running of the machine, but simply relieves the compressor of its load. It works on a variation of about two pounds.

The machine is self-contained, easily lubricated, and practically dust proof. We shall be pleased to quote on these Single Stage Compressors, which we build either with or without sub-base, loose pulleys or governors, as desired.

Write to Us for List of Users

FOUNDRY ELEVATORS

Compressed Air and Hydro-Pneumatic Elevators

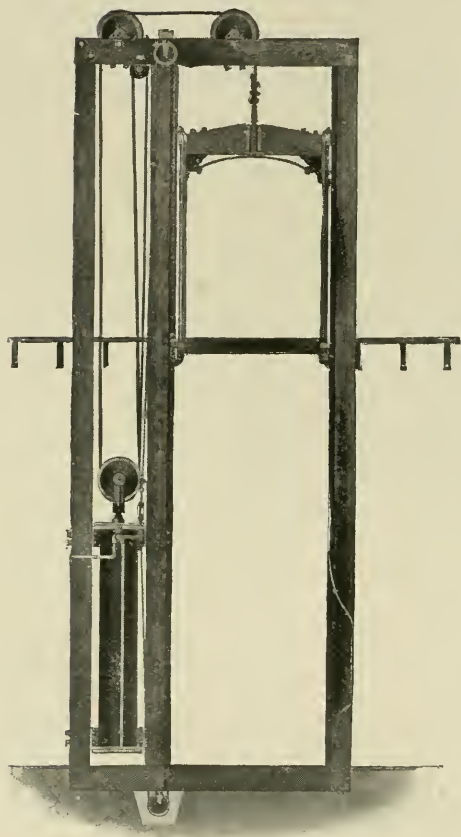


FIG. 448

The application of air hoists for elevator service is worthy of consideration wherever compressed air is available. It offers a very simple and safe method for the operation of elevators for foundries and similar purposes. Water may be used in combination with air in the hydro-pneumatic type of elevator. Steam may be substituted for air, but is not recommended on account of unavoidable losses occasioned in the use of steam in this way.

Platform has oak frame, thoroughly braced with tie rods and straps, and fitted with our improved roller guides. Cylinder is furnished ready to bolt to foundation and framing; is fitted with proper valve arranged to cut off automatically at top and bottom of lift. Necessary hoisting rope and sheaves, for lead as shown, and hardwood guide strips are supplied. The elevator is complete, ready to set up

and operate on proper power being supplied. Standard sizes are given in table, but platform and height of lift may be changed to suit purchasers' conditions.

Capacity.	Standard Size of Platform.	Standard Lift.
1,000 lbs.	4 x 5 feet.	12 feet.
2,000 "	5 x 6 "	12 "
4,000 "	5 x 6 "	12 "
6,000 "	5 x 6 "	12 "

Complete drawings of installation furnished when order is placed.

FOUNDRY ELEVATORS.

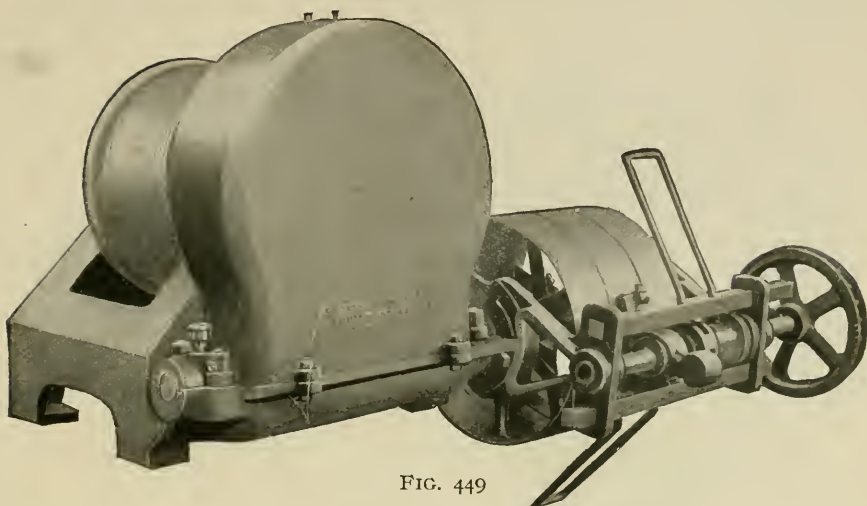


FIG. 449

Belt Power, Worm Geared, Hoisting Machine

The use of a well designed and substantially constructed modern elevator operated by power will pay better returns to the foundry than almost any other item of equal expense. There is a great saving in labor, and the output of the foundry may be largely increased by the installation of a practical elevator.

The machines described on the following pages are designed for hard service, the construction is simplified to the greatest possible extent, and liability of repairs reduced to the minimum. We design and furnish all kinds operated by steam, compressed air or electricity.

All standard machines are self contained. Installation is readily accomplished by ordinary mechanics.

Many years' experience, during which improvements have been steadily adopted, and the widespread use of our elevators is a sufficient guarantee of their serviceability.

Table of Standard Sizes

Capacity	Size of Platform	Lift	Diameter of Drum	Diameter of Sheaves	Belt Power Elevators.			
					Size of Pulleys	Speed of Pulleys Revolutions per min.	Speed of Lift, Feet per min.	Horse Power
2000 lbs.	5x6 ft.	12 to 20 ft	18½ in.	15 in.	18x4 in.	285	20	4
4000 "	5x6 "	12 to 20 "	18½ "	15 "	18x4 "	250	20	6

Speed of lift and horsepower of electric elevators will be specified in proposals.

ELECTRIC AND BELT POWER ELEVATORS

Spur Geared

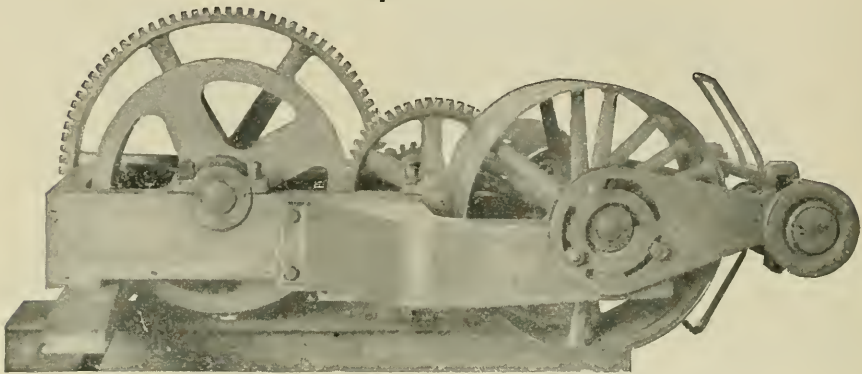


FIG. 450

Belt Power Spur Geared Hoisting Machine

Hoisting machine is self-contained. Cast iron frame is compact and of ample strength.

Spur gears alone are employed; all gears except drum gear have machine cut teeth.

Drum is of large diameter and grooved to take entire length of hoisting rope without double wrapping.

An improved brake is furnished which automatically sustains the load at all times; the braking action being proportional to the load on cage.

When operated by electric motor, frame is modified to suit and back gearing introduced.

Pulleys for belt power elevators are of liberal dimensions. Loose pulleys have babbitted hubs.

Belt shifter is adjustable for various angles of belt within 90°. Operation is controlled by means of hand rope. Automatic stop cuts off power at top and bottom of lift.

Table of Standard Sizes

Capacity	Size of Platform	Lift	Diameter of Drum	Diameter of Sheaves	Belt Power Elevators			
					Size of Pulley	Speed of Pulleys, Revolutions per min.	Speed of Lift	Horsepower
4000 lb	5x6 ft.	12 to 20 ft.	24 in.	15 in.	24x4 ¹ / ₂ in.	230	20	6
6000 lb	5x6 "	12 to 20 "	24 "	18 "	24x4 ¹ / ₂ "	230	20	8
10000 lb	6x7 "	12 to 20 "	30 "	24 "	30x6 ¹ / ₄ "	200	20	13

Speed of lift and horsepower of electric elevators will be specified in proposals.

ELECTRIC SPUR GEARED HOISTING MACHINE

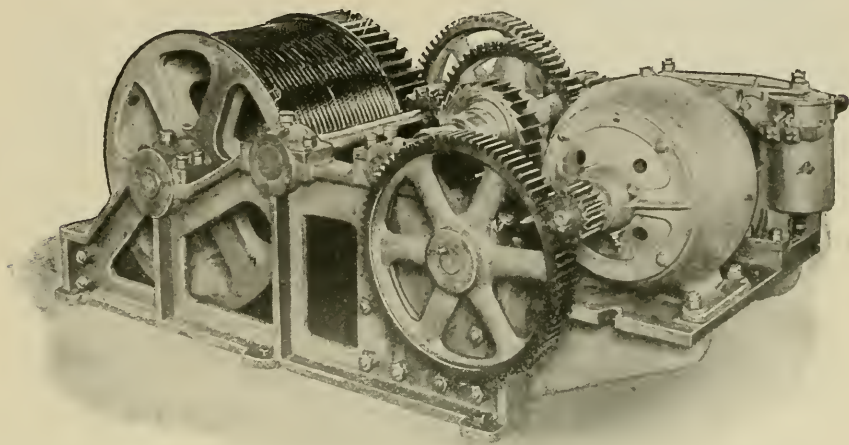


FIG. 451

Electric and Belt Power Elevators

Spur Geared or Worm Geared

Hoisting machine is self contained. Cast iron frame is compact and well designed; arranged to bolt on top or underneath head timbers.

Worm and wheel have machine cut teeth and run in oil. Gearing is incased in cast iron, dust proof cover.

Drum is of large diameter and grooved to take entire length of hoisting rope without double wrapping.

When operated by electric motor, frame is mounted on substantial base which also supports motor. Back gears with machine cut teeth provide the necessary reduction of speed. They are mounted so as to reduce space occupied by gearing to most compact form. Brake is automatic in action and sustains the load at all points.

Pulleys for belt power elevators are mounted directly on worm shaft. Loose pulleys have babbitted hubs, and brake is furnished in connection with tight pulley.

Belt shifter is adjustable for various angles of belt within 90°. Operation is controlled by means of hand rope; automatic stop cuts off power at top and bottom of lift.

ELECTRIC AND BELT POWER ELEVATORS

General

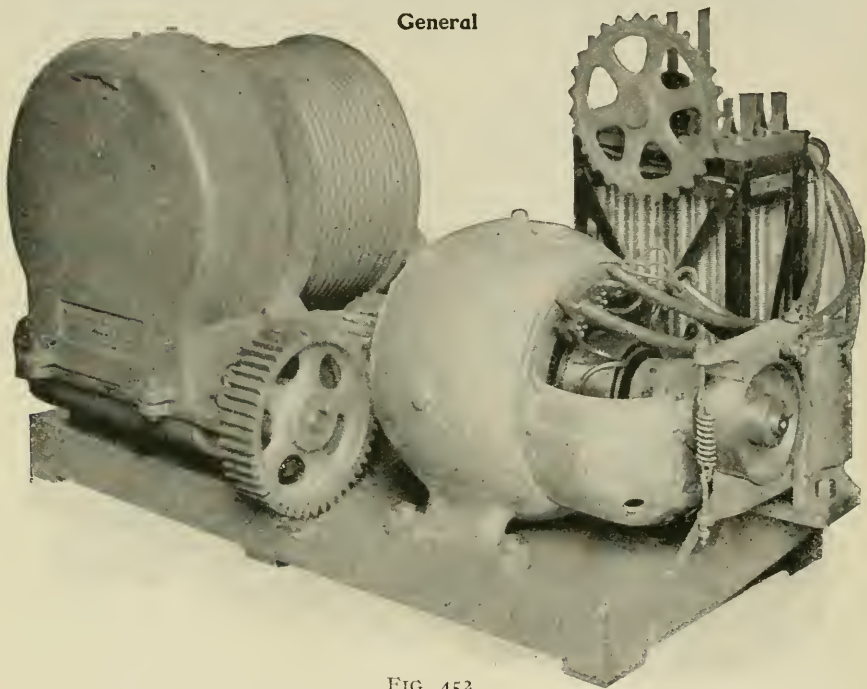


FIG. 452

Electric, Worm Geared Hoisting Machine

(Motor, With Cover Removed. Controller at the Back.)

All bearings are babbitted, and provided with improved lubricating devices. Steel shafting is used. Standard crucible cast steel, flexible hoisting rope is furnished.

For electric elevators, motors are compound wound, four pole, reversible, enclosed type, with self-oiling bearings. Automatic self-starter insures safe operation. Controlling ropes within convenient reach at any point of lift. Stops at top and bottom of lift cut off power automatically.

The electric brake is operated by a solenoid in circuit with the hoisting motor and will automatically come into action when the current is off the hoisting circuit.

Hoisting machine is designed to be located on timber framework directly over elevator well, but location may be changed to suit conditions. An additional charge will be made for guide sheaves and brackets and extra hoisting rope.

Complete elevator includes hoisting machine, necessary hoisting rope for direct lift, controller rope with guide sheaves and brackets, standard oak platform, as described on following page and hardwood guide strips, all ready to set up and operate when proper belts are furnished and power supplied.

ELEVATORS

Standard Platform for Elevators



FIG. 453

Standard Elevator Platform
Two Tons Capacity

The construction of our standard platform is well illustrated in cut opposite. Oak timber is used throughout and all joints are tenoned or bolted.

Tension and brace rods effectually tie the frame together and prevent it from getting out of shape.

Cast iron brackets connect head beam with side pieces.

Guide brackets at top and bottom of side frame are fitted with rollers on both face and sides which bear against hardwood guide strips. The platform is thus maintained in proper position and friction of guides is reduced to a minimum.

Safety Catch

The wrought iron yoke over head beam formed with loop for attachment of hoisting rope, or carrying sheave, as shown in cut, bears against a flat steel spring on its under side, and is connected with levers in such a way that dogs are free when elevator is in service and suspended by hoisting rope. In case of breakage of rope the spring comes into action and dogs are thrown out and engage the guide timbers and hold the platform firmly. Dogs have steel points.

This arrangement will commend itself as a simple and reliable means for insuring the safety of operators or prevention of damage to property.

Steel Frame

If desired a structural steel frame may be supplied at an additional cost.

Prices will be made on elevators with special platforms, and with different heights of lift than specified in tables, when desired.

In ordering always locate countershaft, if belt power is employed, give exact height of lift, position of hoisting machine and entrance to platform in relation thereto.

Complete drawings are supplied, showing clearly the method of erecting.

Prices on application.

INDUSTRIAL RAILWAY SYSTEM

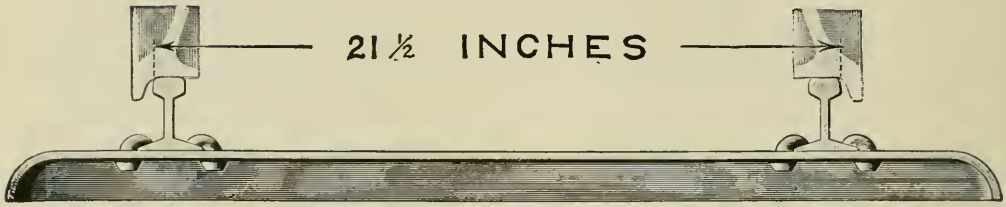


FIG. 454

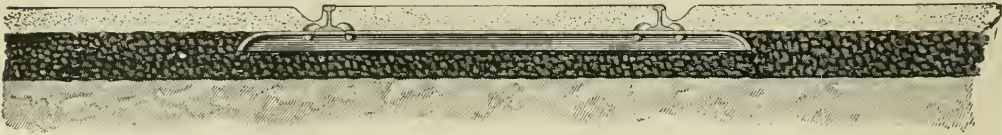


FIG. 455

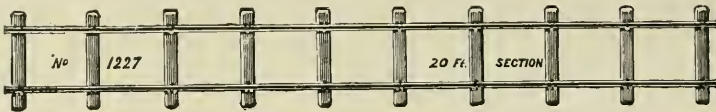


FIG. 456

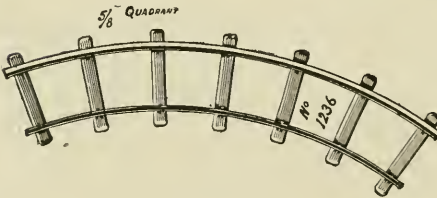


FIG. 457

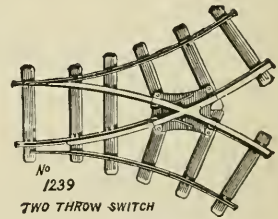


FIG. 458

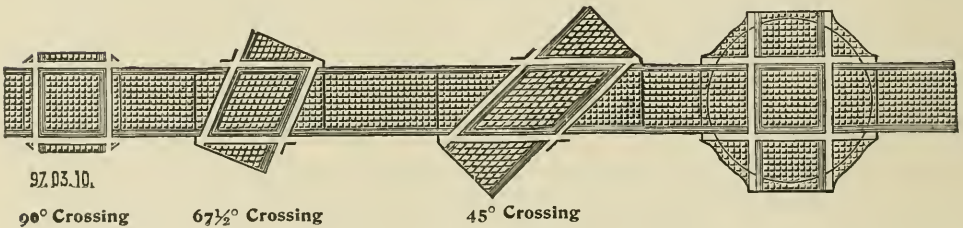


FIG. 459

Straight and curved track, switches and crossings kept in stock, ready for immediate shipment.

They are ready to lay immediately on arrival on the ground.

INDUSTRIAL RAILWAY SYSTEM

Flexible Wheel Base Cars

Our cars have a flexible wheel base, the axles taking a radial position on a curve, the wheels and the radius of the curve being so proportioned that there is no slipping on the rails to cause a waste of energy in friction. The principle on which these cars turn a curve is illustrated in cut No. 1377. A cylinder rolls on a plane in a straight line, without sliding friction; a cone also rolls without sliding friction on a plane, but in a circular direction. If a pair of wheels rigidly fixed on an axle running on a curve have the same diameter as the cone would have at each rail, they are virtually portions of the cone, and the wheels would run around the curve without sliding friction, the axles taking a radial position.

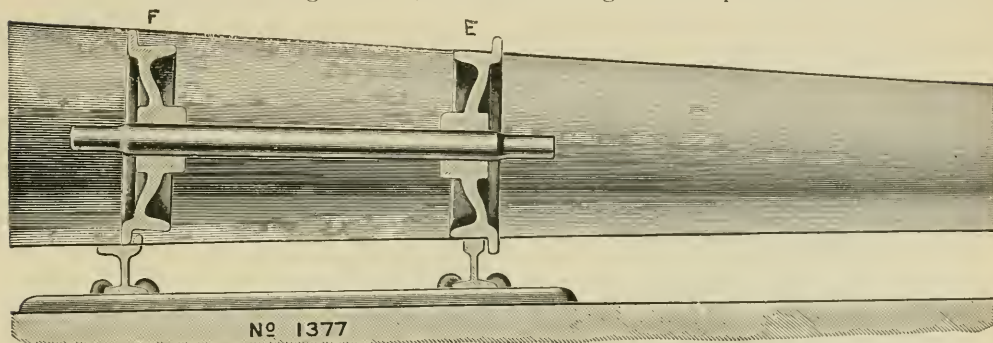


FIG. 460

Eight-Wheel Flat Car

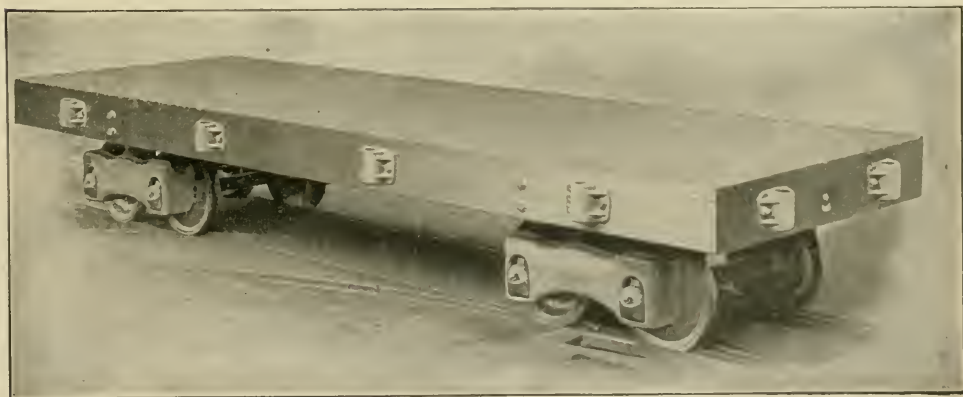


FIG. 461

For handling long, heavy or bulky articles. Has the advantage of distributing heavy loads on more wheels, and on a light track carries double the load that can be carried on a four-wheel car.

All Standard Sizes are kept in stock from which prompt shipments can be made.

INDUSTRIAL RAILWAY SYSTEM

Charging Cars

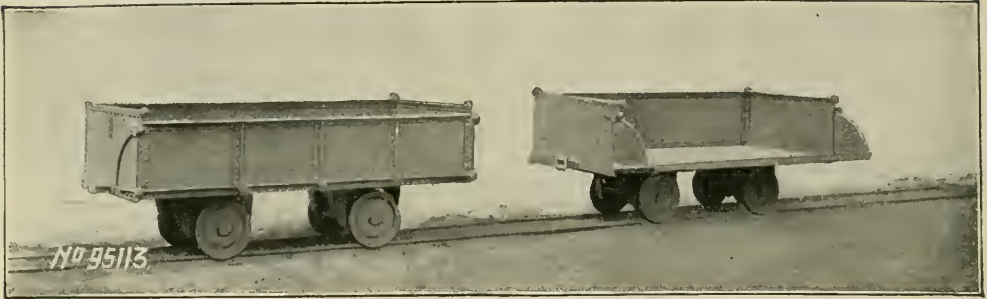


FIG. 462

For bringing coal from storage bins to boiler rooms and retort houses. Is a convenient and economical way of carrying coal to the boiler room.

Tip Cars

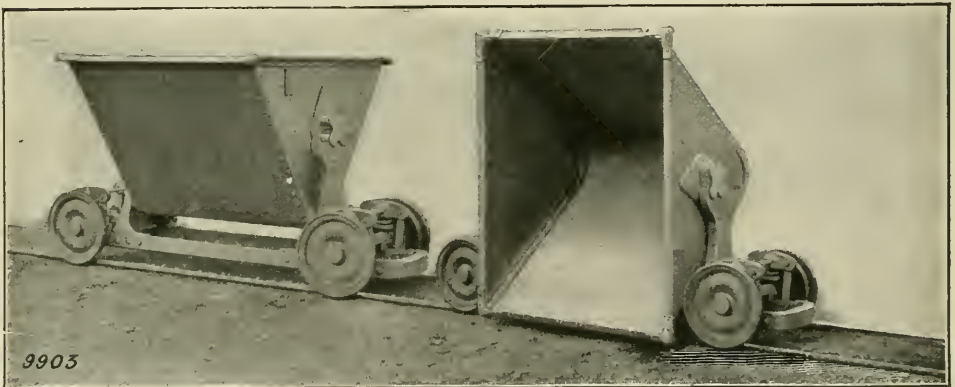


FIG. 463

For handling all varieties of bulk material used in manufactories. Economical and convenient. Especially suitable for dumping into a pit or from a trestle.

Self-Dumping Cars

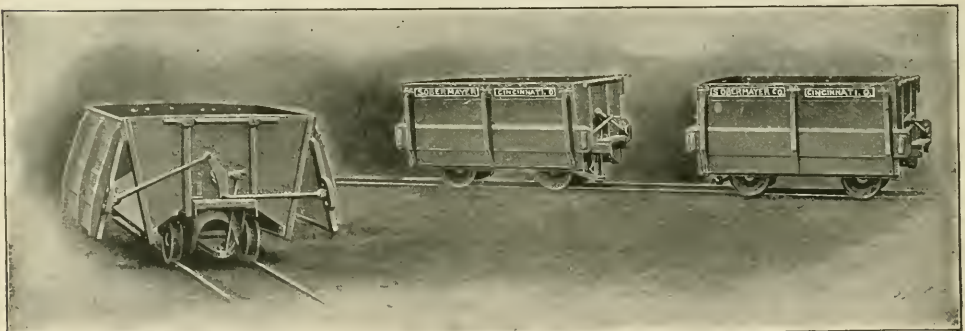


FIG. 464

For use on elevated track, for handling coal. Cars dump on both sides. The easiest running and most satisfactory cars for carrying bulk material.

CRANES OF ALL DESIGNS



We present the following pages containing illustrations, reproduced from photographs, of various cranes in actual service. These engravings will give some idea of the construction and utility of our cranes.

Designs are developed on scientific lines, but with close attention to practical details of construction and operation. Types are standardized and particular features are uniformly adhered to.

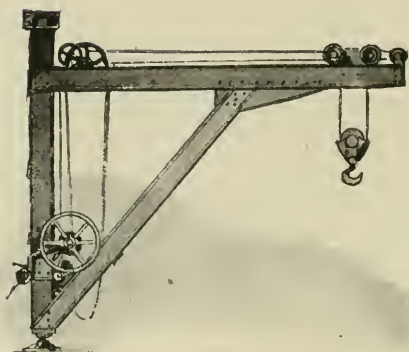
Special consideration is given to the feature of accessibility. All shaft bearings on Electric Travelers have caps, and any shaft may be removed without disturbing other parts. Ample space is provided for motors, bearings, etc. Factor of safety is always fully maintained.

All construction, except motors and controllers, is produced in our own shops. Electrical apparatus is obtained from manufacturers qualified in all respects to obtain most successful results for service required. Frequently motors of same make may be used for cranes as for the shop equipment, which is of considerable advantage in attention and repairs, if necessary.

In the list of users of our cranes will be noted the names of many leading concerns whose judgment in selection of cranes cannot be questioned. When it is considered in addition that successive orders have frequently been received, it must be appreciated that our cranes have decided features of merit.



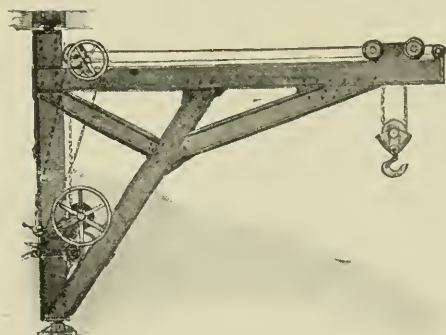
JIB CRANES



Type A

Single Under-Braced Jib Cranes

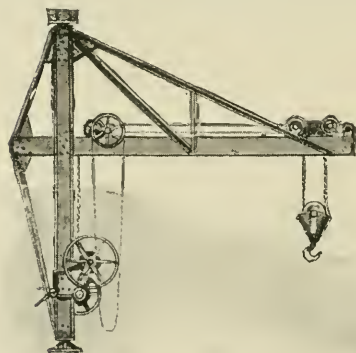
Usually the Single Braced Jib (Type A.) can be constructed at a lower cost than any other type. It represents the simplest form of jib crane and is adaptable in nearly all locations.



Type B

Triple Under-Braced Jib Cranes

The Triple Braced Frame is most suitable for locations requiring ample clearance under the jib and proportionally large radius of jib.



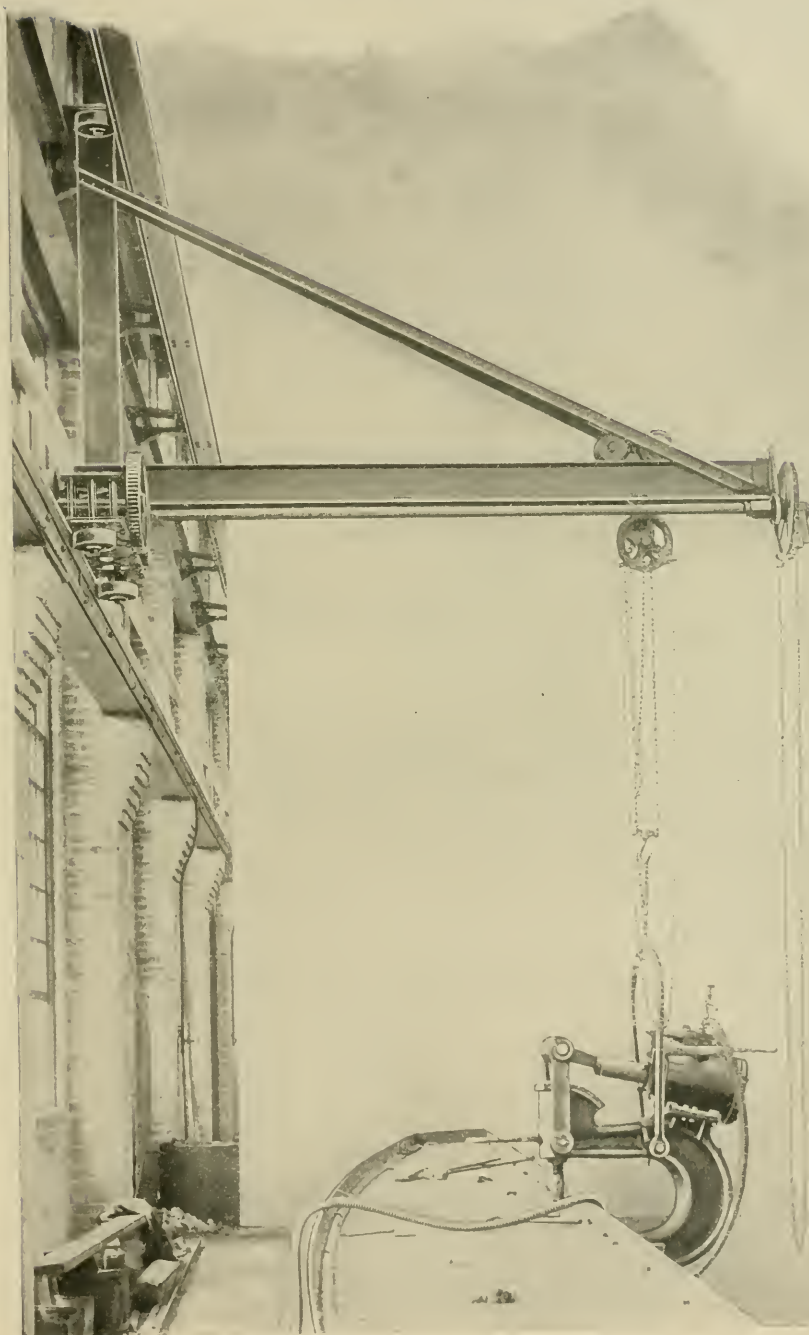
Type C

Top-Braced Jib Cranes

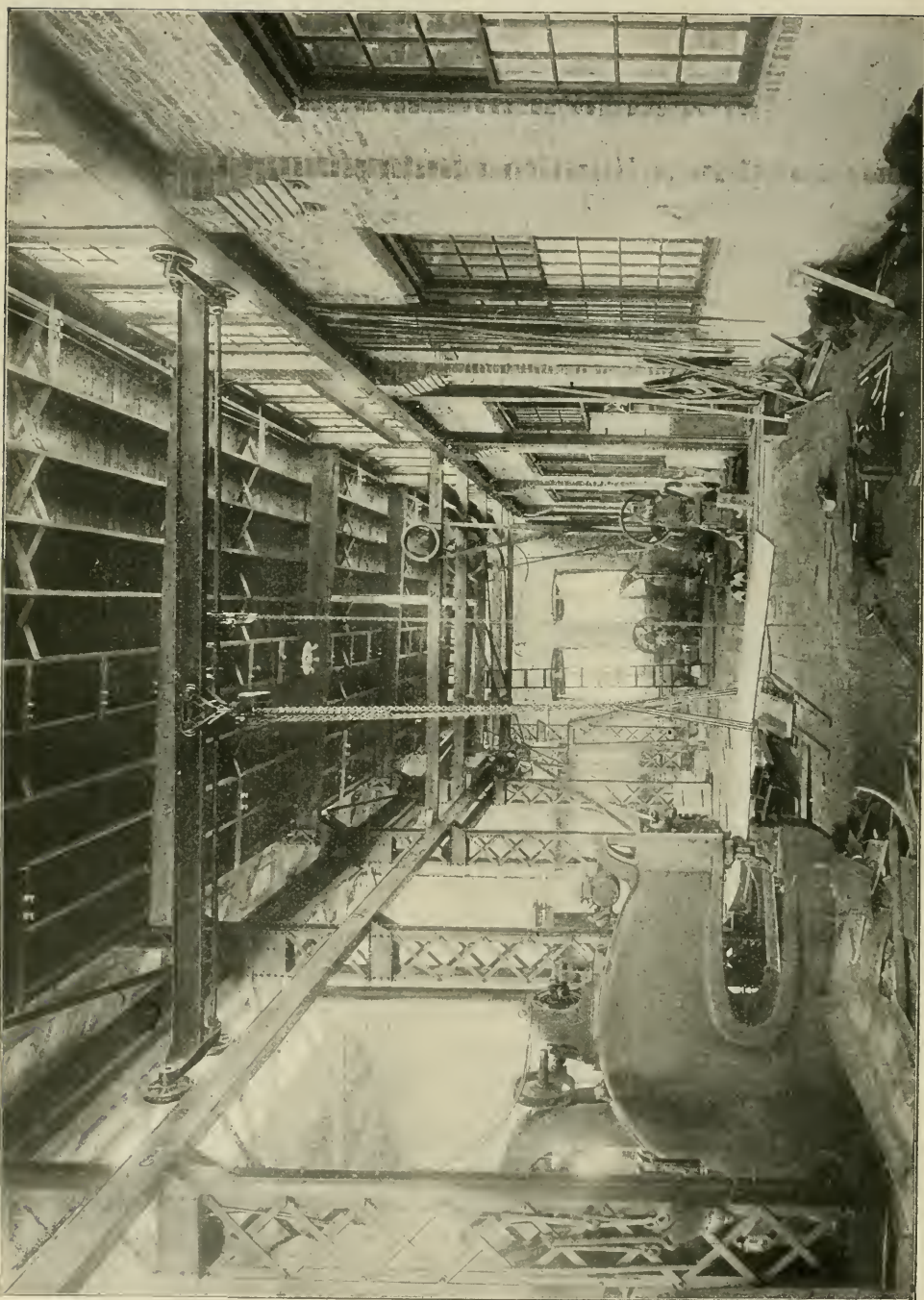
The Top-Braced Jib is adapted to high ceilings and to yard use. It possesses the advantage of a perfectly clear space under the jib. This type is most highly recommended where installation is at all feasible.

For Prices Give Height of Mast, Length of Jib, Type of Frame, Most Available Power and Class of Work

BRACKET CRANES

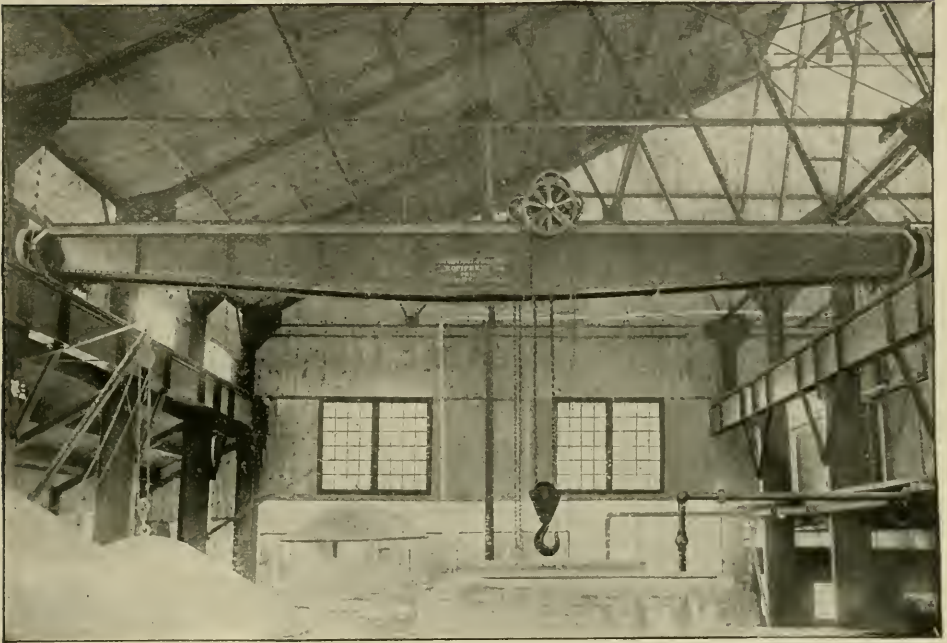


Traveling Bracket Crane
Carrying Pneumatic Riveter



I Beam Traveler, 1 Ton Capacity, with Chain Block

HAND POWER TRAVELERS

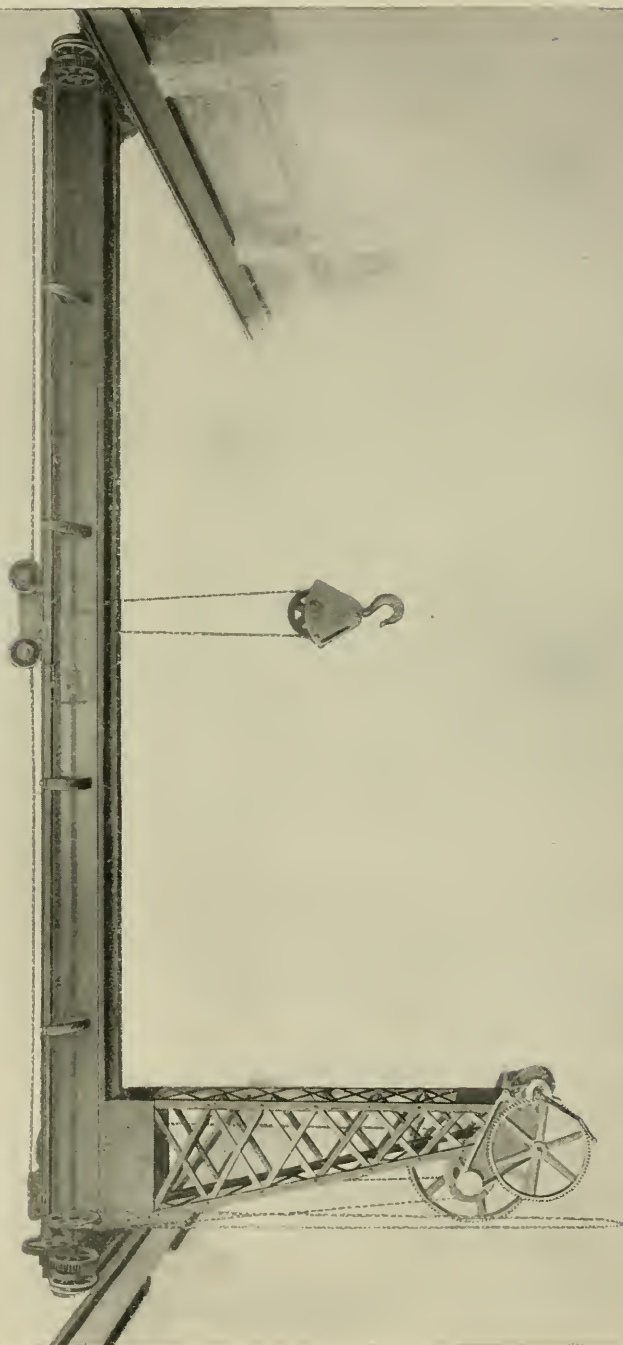


Hand Power Traveling Crane
Chain Sprocket Hoist

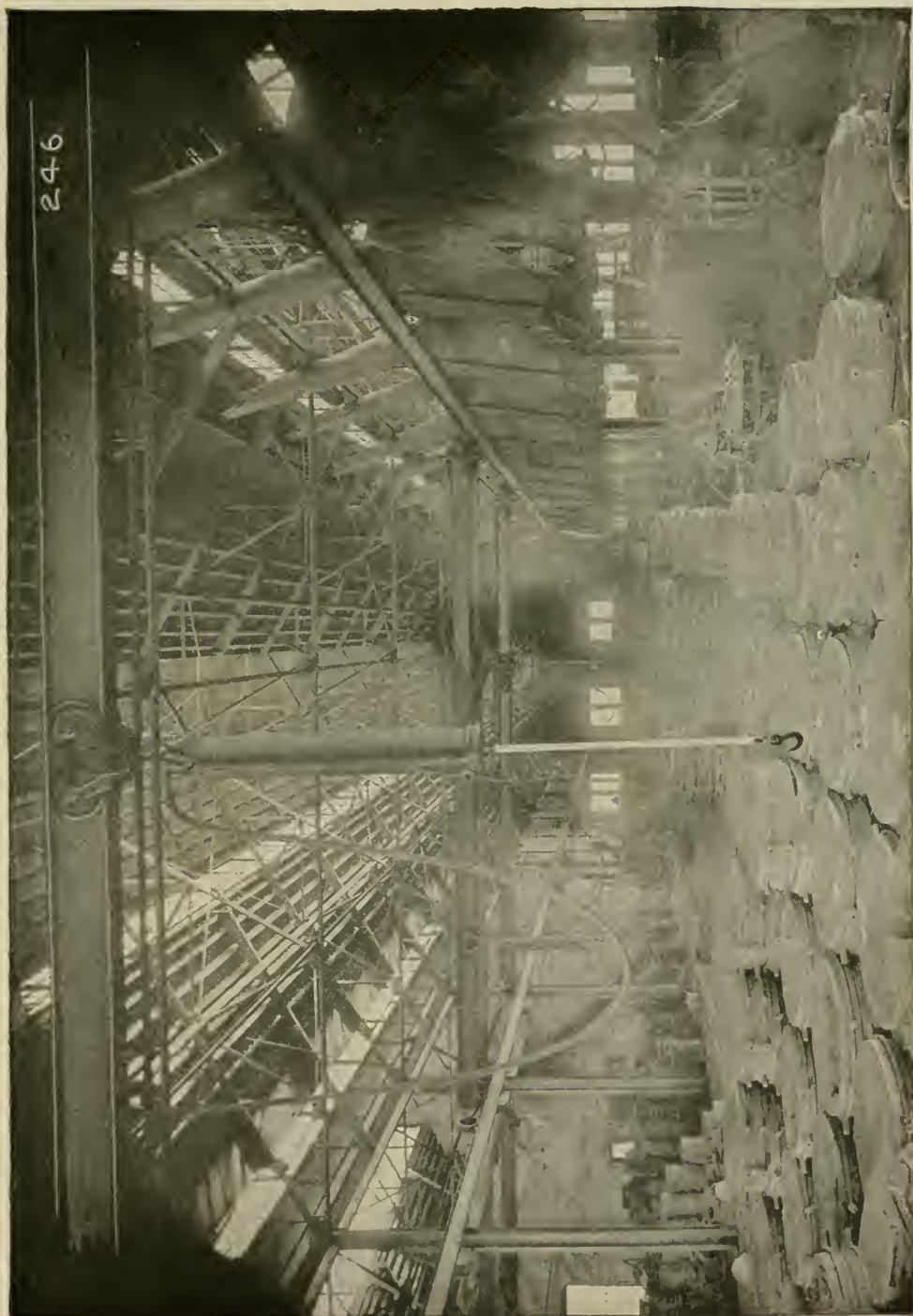
Chain Sprocket Hoist Traveling Cranes are used in connection with a free trolley, which contains the hoisting gear operated with two speeds.

All movements are controlled from the ground by means of pendant chains operated by hand. All chains are of uniform pitch, accurately fitting the sprocket wheel. Where a bridge or trolley platform is used they are operated by hand cranks. This type of crane is for all capacities, is standard construction, and is used in power houses for placing machinery and making repairs; in mills for handling operating machinery, and valuable in other situations where occasional service only is required. It is perfectly reliable in construction and can be installed at a minimum expense.

**The Standard Power Station Crane for Electric
Railways and Electric Light Plants**



Hand Power Traveling Crane—Floor Pendant Type

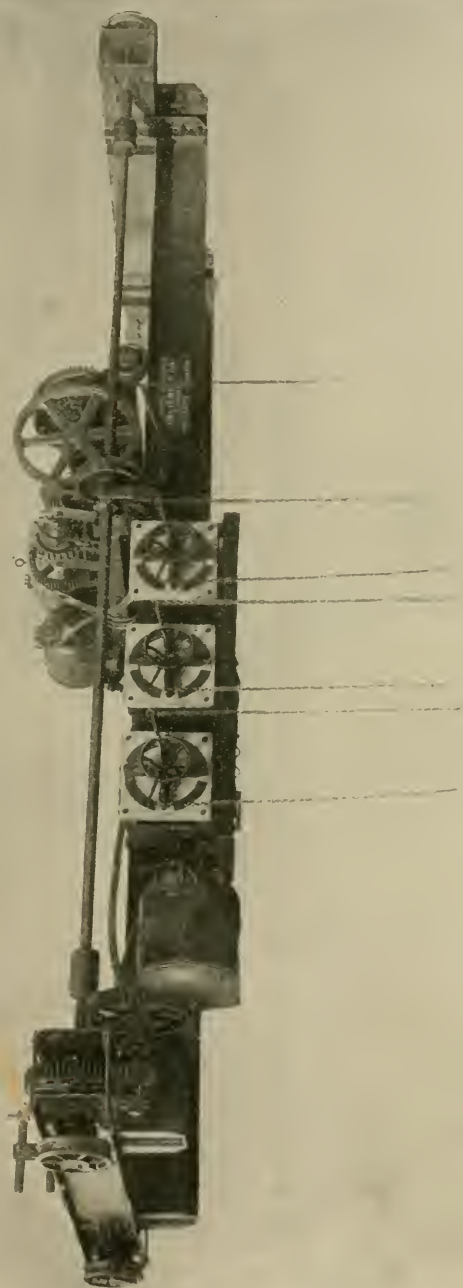


Works of McCormick Harvesting Machine Co., showing some of the 28 Compressed Air Cranes furnished for that company

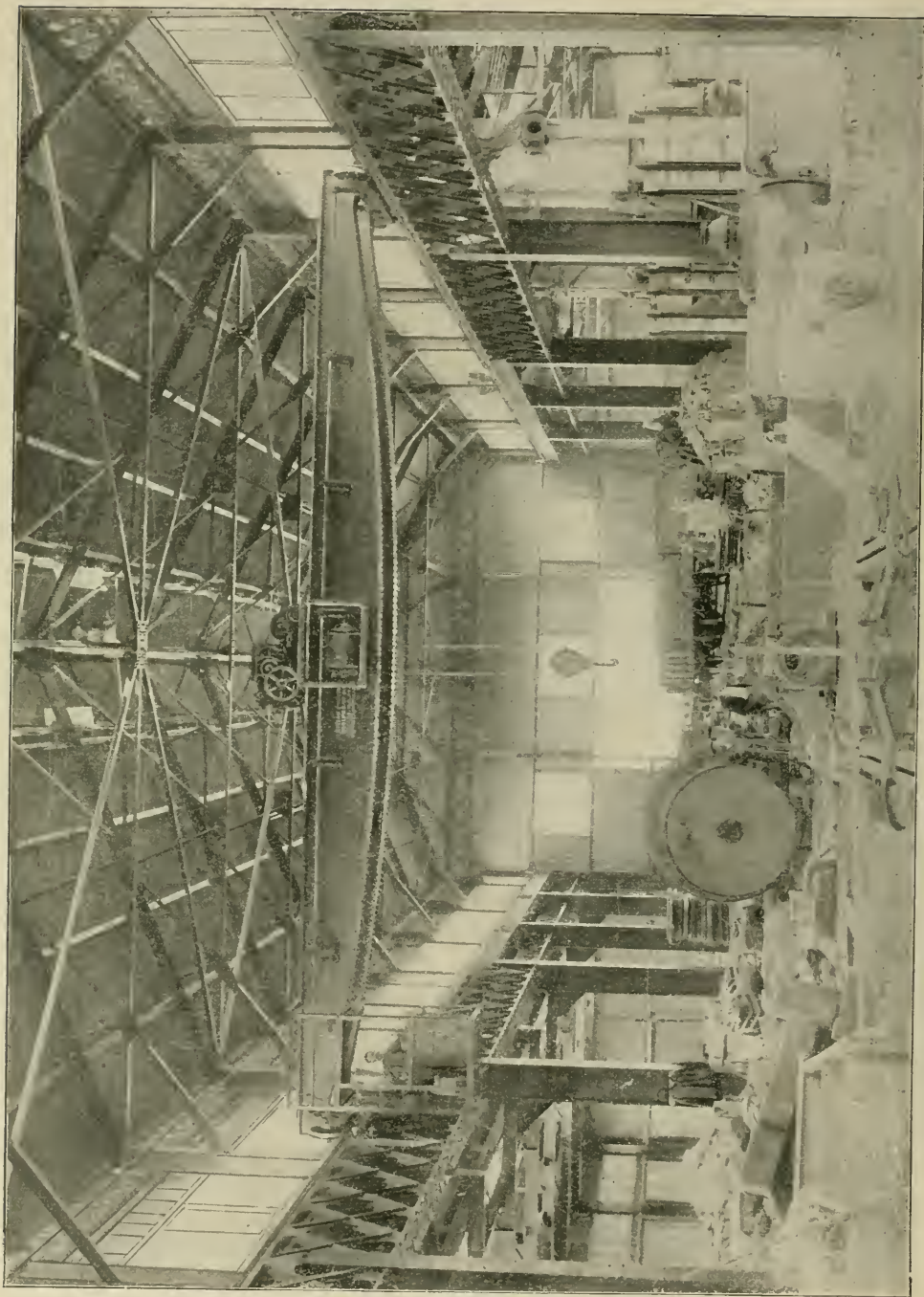
(Air Hoist on Trolley on Lower Flange I Beam)



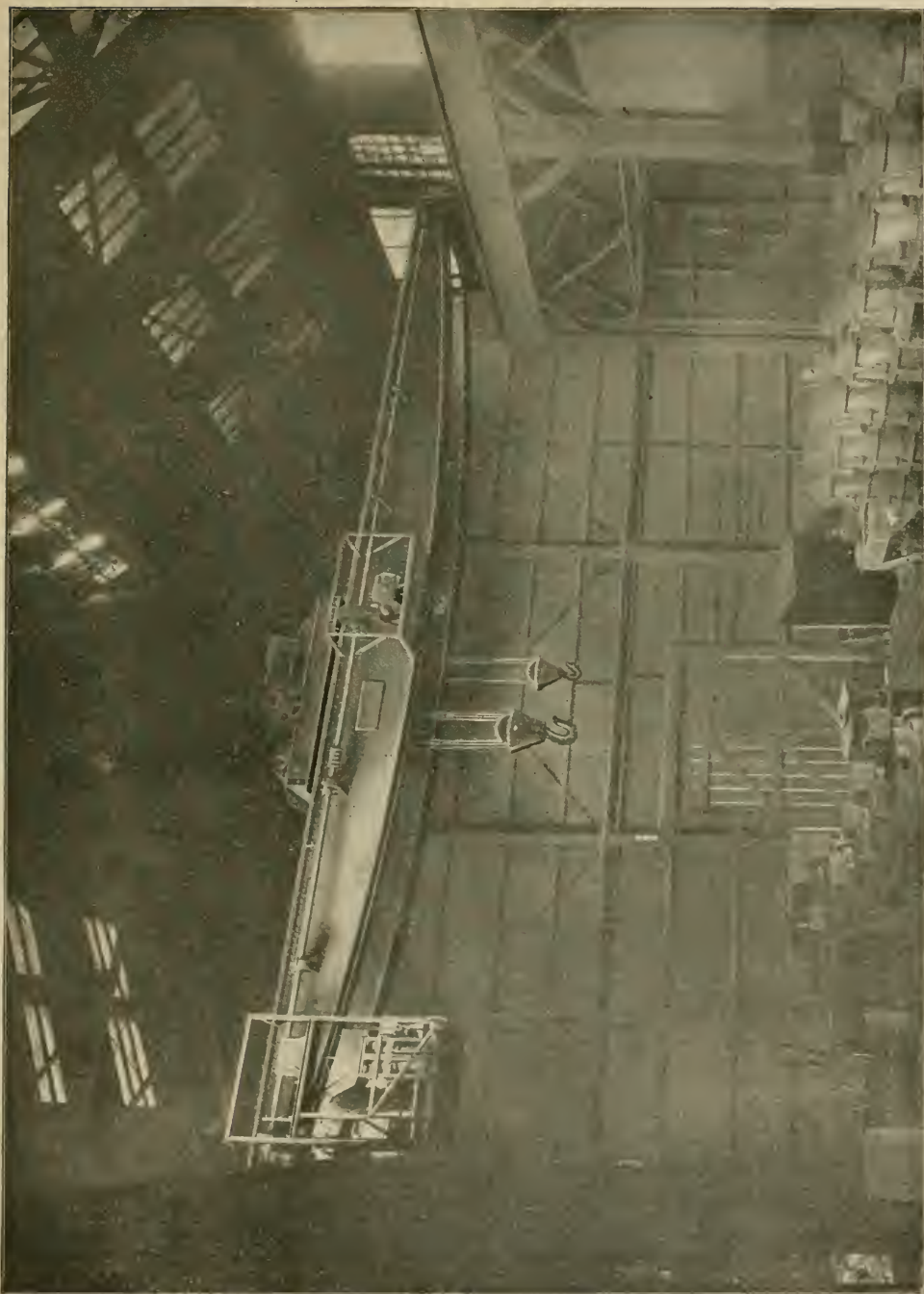
Compressed Air Traveling Cranes, Cylinder Hoist and Motor Travel, in Foundry of P. H. & F. M. Roots, Connorsville, Ind.



Special Three-Motor Electric Traveler, with Overhanging Trucks
Especially Designed for Low Head Room—Controlled from the Floor



Three-Motor Electric Traveling Crane, 10 Tons Capacity, for Jessop Steel Co., Washington, Pa.

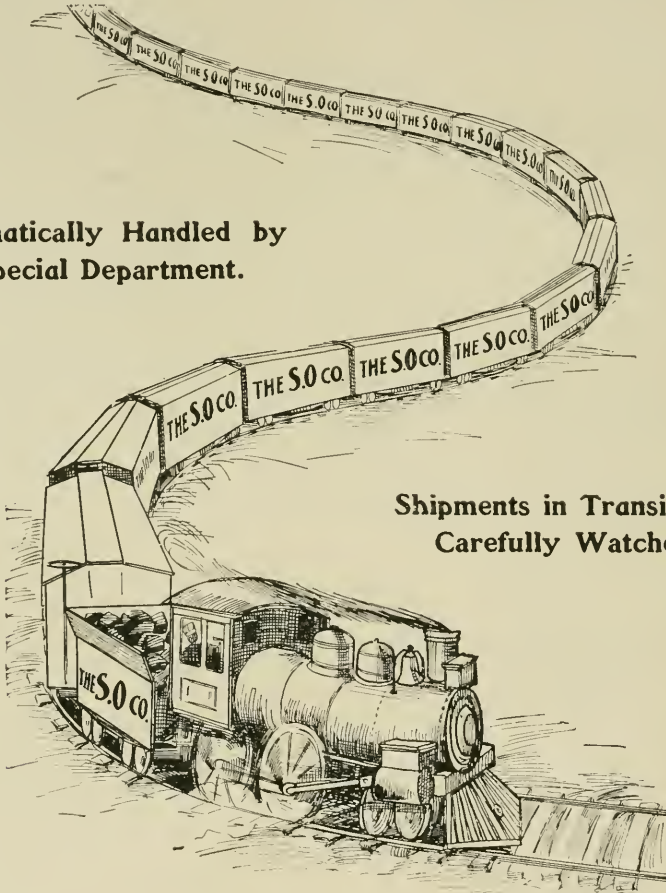


Four-Motor Electric Traveling Crane. Capacity, Main Hoist, 40 Tons. Auxiliary Hoist, 10 Tons.
For Illinois Steel Co., South Chicago

OUR TRAFFIC DEPARTMENT

The importance of giving especial attention to the handling, routing and rating of shipments, proper presentation and prosecution of claims, etc., is recognized by leading industries throughout the country, and the advantages to the customer are obvious in dealing with a firm where such matters are

**Systematically Handled by
a Special Department.**



**Shipments in Transit are
Carefully Watched**

and if delayed are immediately traced, located and delivered. Claims for loss or damage are promptly investigated, information furnished as to most direct routing, proper rating, etc., and the resources of the Department are instantly and constantly at the customer's service. All correspondence with reference to shipments should be addressed to our **Traffic Department**. Use cipher code if necessary, pages 365-369.

WE CAN TELL YOU HOW TO SAVE MONEY IN YOUR BLACKSMITHING DEPARTMENT

In nearly every manufactory in which iron or steel is used in construction, there is a great amount of bending of these materials which is accomplished by hand, simply because it would hardly pay to buy expensive power machinery, or because the power machinery in use necessitates the outlay of too much time and expense in making and setting forms, to warrant its use on any but large jobs.

To handle this class of work we are manufacturing and handling a line of low-priced **Hand Bending Tools**—machines that are daily earning the title “money savers” in many shops throughout the country.

ANGLE BENDERS

Built in Two Sizes

No. 1

Bends flat stock up to 2 inches wide by $\frac{3}{8}$ -inch thick, and round or square stock up to $\frac{3}{4}$ -inch. Bends $\frac{3}{8} \times 1$ inch and under edgewise.

Price, with one set of dies \$18.00

Set of dies for light edge bending, . . \$ 2.00

Clean, square corners result from the use of these machines. Many light jobs can be bent cold. Their money saving ability is especially evident in the ease and rapidity with which they can be set to take different sizes of stock and to bend angles of different degrees.

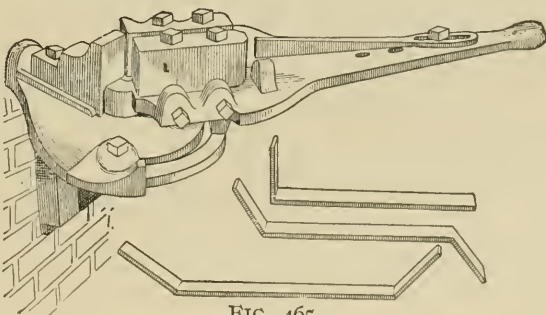


FIG. 465

Especially adapted for bending LININGS for SNAP FLASK work in FOUNDRIES.

No. 2

Patented July 15, 1902

Bends flat stock up to 4 inches wide by $\frac{1}{2}$ inch thick, and round or square stock up to $1\frac{1}{4}$ inch. Bends $\frac{3}{8}$ by $1\frac{1}{4}$ inch stock and under edgewise. Bends angle iron if a triangular piece of stock is cut from the upper wing.

The No 2 angle bender takes work of an astonishing range for a hand machine, and will be found highly valuable in many shops.

Price, with two full sets of dies, \$30.00

Special Dies Up to 24 Inches High Made to Order. Prices on Application

OBERMAYER EYE BENDERS

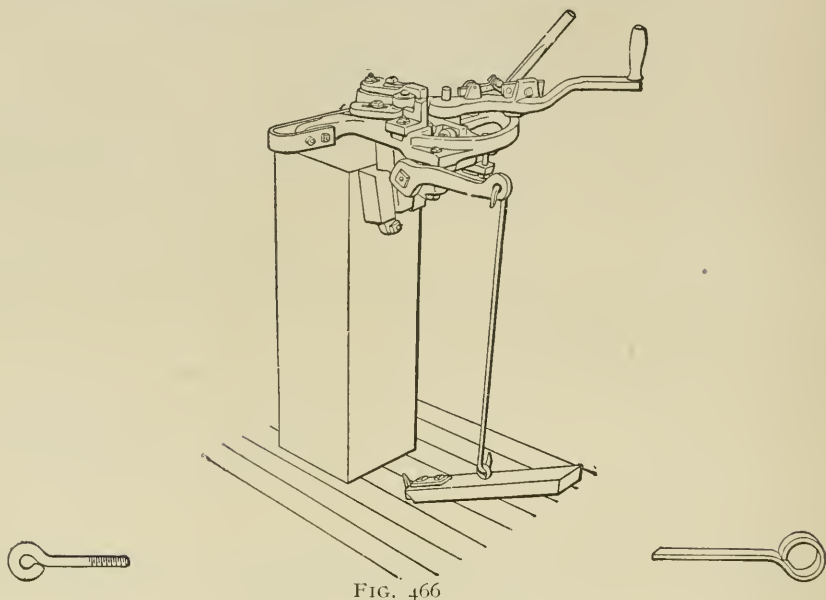


FIG. 466

Built in Three Sizes

No. 1 takes stock up to and including $\frac{1}{2}$ inch. Bends rings and eyes up to $2\frac{1}{2}$ inches, outside diameter.

Price, \$20.00

No. 2 takes stock up to and including $\frac{3}{4}$ inch. Bends rings and eyes up to 3 inches, outside diameter.

Price, \$25.00

No. 3 takes stock up to and including $1\frac{3}{8}$ inches round or square. Bends eyes up to 7 inches, outside diameter.

Price, \$40.00

These machines bend **hot stock** and turn out perfect eyes and hooks, uniform in character and size.

Our system of gripping the end of the stock and carrying it around a forming pin enables the operator to turn eyes on the ends of long rods.

Their money saving ability is especially evident in the ease and rapidity with which they can be set to take different sizes of stock and to bend different forms.

Ease and quickness of adjustment, simplicity and rapidity of operation, wide ranges of adaptability—these are the main points of advantage which render them valuable.

If you are in doubt as to which of the different patterns of these tools is most suited to your needs, or if you have work which you think will require special machines or parts, send us drawings, blue prints, sketches or samples of the work you have to bend, with dimensions, and we will tell you definitely what we can do to meet your requirements.

Stock Room Chicago Warehouse**View of One Floor of Equipments****SUNDRIES**

Bolts, Stove.	Hammer, Sledge.
Core Flour (mixtures,)	Hoisting Rope.
Core Sand.	Limestone.
Dextrine.	Linseed Oil.
Diamond Pattern Lumber.	Low Grade Flour.
Dolomite.	Malleable Iron Furnaces.
Drop Doors, Cupolas.	
Excelsior Facing.	Mica for Cupola Holes.
Eye Shields, Mica.	Pattern Lumber.
Fire Mortar.	Powdered Glue.
Fire Stone.	Red Dog Flour.
Flint.	Sand Driers.
French Molding Sand.	Steel Sand.
Ground Silica.	Stove Polish
Gum Shellac.	Vitriol.

SWIVELED TYPE TRUCK LADLES

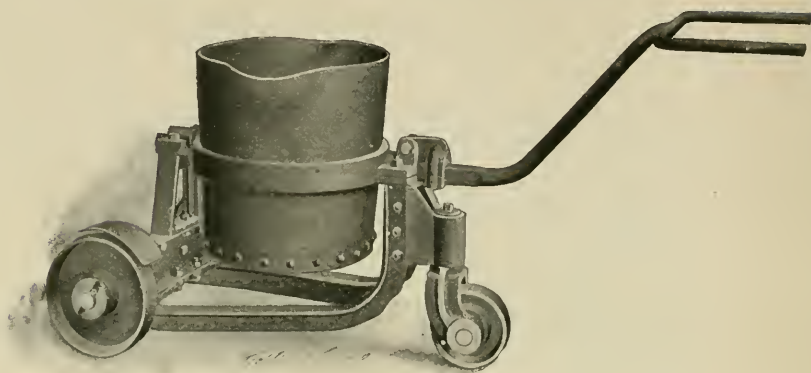


FIG. 467

These Truck Ladles are made with capacities of 500 pounds and one ton.

UNIVERSAL PATTERN MAKERS' VISES

Easily operated and practically the most convenient and economic vises on the market today.

They are made in three sizes.

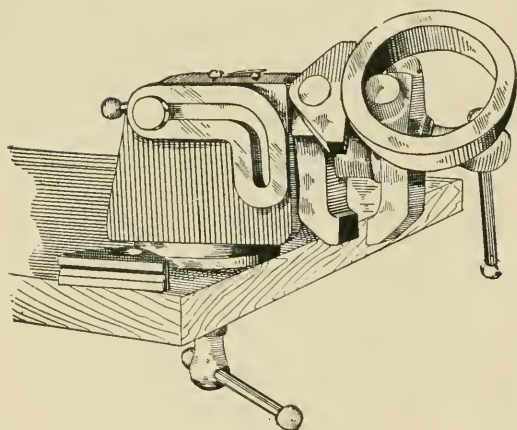


FIG. 468

Metal Pattern Makers'

They can be quickly adapted to any required position.

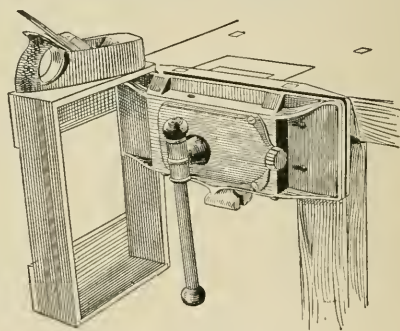
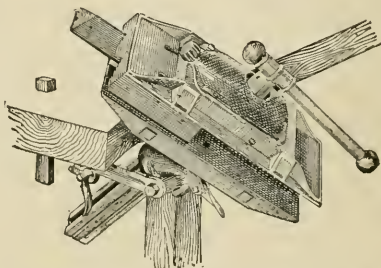


FIG. 469

Wood Pattern Makers'



Wood Pattern Makers' (different view)

Write for further information and prices

MOLDING SAND OF ALL KINDS

WE FURNISH

Cincinnati Sand

Newport “

Zanesville “

Sandusky “

Centerton “

Albany “

French “

Brass Molding Sand

Steel Silica Sand

Suitable
for

Heavy Machinery Castings.

Medium and Light Castings.

Large and Small Cores.

Piano Plates.

Geared Wheels.

Radiators.

Stove Plate Castings.

Snap Work.

Car Wheels.

Light and Heavy Brass Castings.

Light and Heavy Malleable Castings.

Steel Castings.

ALSO

Hard Silica Rock.

Crushed Rock.

Fire Sand.

Fire Mortar.

Ground Flint.

Ground Ganister.

Ground Quartz.

Crushed Ganister.

Ground Silica Rock.

Welsh Mountain Clay.

Welsh Mountain Rock.

White Core Sand.

Core Gravel.

Kaolin.

Lake Sand.

River Sand.

We own and operate Sand Banks and Quarries in different parts of the United States, and our shipping facilities are such that we can furnish material suitable for your class of work, making shipments from the point nearest to the manufacturer. Correspond with us, stating kind and quality of castings you manufacture and we can determine the sand most suitable for your work.

MOLDING SAND SUITABLE FOR STEEL CASTINGS

Silica Sand, Quartz, Gannister, Silica Rock, Welsh Mountain Fire Clay, and Core Sand

Our Eastern quarries are situated in the heart of the well known district of Pennsylvania, noted for its superior quality of Silica Sand. Our facilities for handling and grinding this kind of material are unsurpassed. We have the most modern and up-to-date plant of its kind, and by our improved cleaning process we extract the Kaolin and our product analyzes 98 to 99% Silica. This material can be furnished in any degree of fineness, absolutely dry when so ordered, and free from loam and all organic matter.

Cores when made properly do not break or blow in the casting, and when rapped readily peel or rattle out. Our high Silica Sand is used extensively by steel manufacturers on bottom of furnace beds, and gives excellent satisfaction. The following brands may be used for:

Green Sand Molds	{	Obermayer's Heavy Steel Silica Sand.
		"Esso" Steel Silica Sand.
		Welsh Mountain Clay. Siliceous Clay.
Dry Sand Molds	{	"Esso" White Silica Sand.
		Hard Silica Rock.
		Ground Silica Rock.
		Special Steel Mold Wash.
		Silica Flour.
		Welsh Mountain Clay.
Core Sand	{	Ground Silica Wash. We can furnish any kind, suitable for heavy, medium, or light castings.
		Crushed Welsh Mountain Rock.
		Silica Sand.
		Fine Grade Crushed Gannister.
		Lake or River Sand.
		White Fine Crushed Silica Rock, washed, screened and thoroughly dried if desired.

Capacity four to five cars per day. Our mills are situated direct at the quarries along side of Pennsylvania Railroad track, and our shipping facilities cannot be excelled. Our Western shipments are made direct from the Massillon District from which mines we are shipping all kinds of Molding and Core Sand for small or large steel castings. When wishing information regarding Open Hearth, Bessemer, Basic or Crucible Steel Molds, write us for prices and samples.

TO THE MOLDERS!

WE HAVE IN STOCK
Ready for Immediate Shipment

STANDARD REFERENCE BOOKS

Regarding the Melting of

IRON, BRASS OR STEEL.

THESE BOOKS ARE OF GOOD VALUE TO YOU — Note the Following :

Shipped with Charges Paid to Any Point in America

American Foundry Practice—By THOS. D. WEST. Price \$2.50 vol. net. Treats of loam and dry sand and green sand molding and management of Cupola.

Molders' Text Book—By THOS. D. WEST. Price \$2.50 vol. net. Treats of Cupolas, best method of handling and melting iron.

Modern Molding and Pattern Making—By J. P. MULLIN. Price \$2.50 vol. net. Treats of pattern shop and foundry work.

Practical Iron Founding—Price \$1.50 net. A condensed treatise on molding with practical rules.

Founding of Metals—By EDWARD KIRK. Price \$2.50 vol. net. A treatise on melting, together with mixtures of metals.

The Iron Founder—By SIMPSON BOLAND. Price \$2.50 vol. net. A treatise on molding, shrinkages, pressure of molds, etc.

Iron Foundry Supplement—By SIMPSON BOLAND. Price \$2.50 vol. net. Illustrated—regarding foundry equipment.

Practical Brass and Iron Founders' Guide—By JAMES LARKIN. Price \$2.50 vol. net. Treats of brass founding and mixture of metals.

Cupola Furnace—By EDWARD KIRK. Price \$3.50 vol. Best method of management of cupola, placing tuyeres, lining, etc.

Cast Iron—By WM. J. KEEP. 225 pages, 8vo., cloth, price \$2.50 net. A record of original research.

Other technical books secured when desired, and furnished at
lowest Jobbers' Prices

PIG IRON

ALL THE LEADING BRANDS

FOUNDRY COKE

BLACKSMITHS' COAL

COPPER

TIN

LEAD

ZINC

ANTIMONY

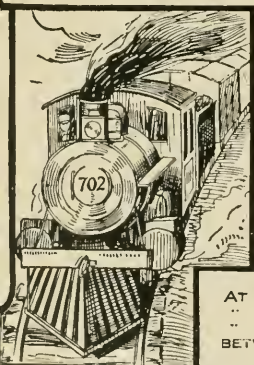
MANGANESE

ALL THE ABOVE METALS AT LOWEST PRICES

MIXED CARLOADS A SPECIALTY

Shipped During Year 1903,

**FORTY SOLID MILES OF FOUNDRY FACINGS,
FOUNDRY SUPPLIES, PLUMBAGO, BLACK LEAD.**

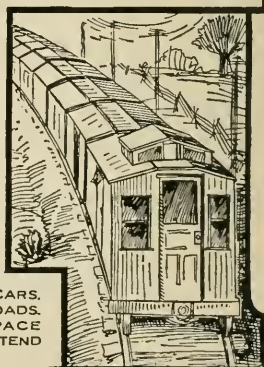


THE S. OBERMAYER CO.
CINCINNATI, O.
CHICAGO, ILL. PITTSBURG, PA.
General Offices: Cincinnati, O.

FULL CARLOADS. . . . 4,410
NET TONS. 80,291
POUNDS. 160,582,000

AT AN AVERAGE OF 30,000 POUNDS PER CAR, EQUALS 5,353 CARS.
" " " " 30 CARS TO THE TRAIN, EQUALS 178 TRAINLOADS.
" " " " 34 FEET TO A CAR, ALLOWING USUAL SPACE
BETWEEN CARS AND LENGTH OF ENGINES, THESE TRAINS WOULD EXTEND

FORTY MILES



FAN TYPE BLOWERS

Table of Speeds and Capacities as applied to Cupolas

No. of Blower	Square Inches Blast	Diameter Inside of Cupola, in Inches	Pressure in Ounces	Speed—No. of Revolutions per Minute	Melting Capacity in Lbs. per Hour	Cubic Feet of Air Required per Minute	Pressure in Ounces	Speed—No. of Revolutions per Minute	Melting Capacity in Lbs. per Hour	Cubic Feet of Air Required per Minute
4	4	20	8	4732	1545	666	9	5030	1647	717
5	6	25	8	4209	2321	773	10	4726	2600	867
6	8	30	8	3660	3093	951	10	4108	3671	1067
7	14	35	8	3244	4218	1486	10	3642	4777	1668
8	18	40	8	2948	5425	2199	10	3310	6082	2469
9	26	45	10	2785	7818	3203	12	3260	8598	3523
10	36	55	10	2195	11295	4938	12	2413	12378	5431
11	45	65	12	1952	16955	7707	14	2116	18357	8358
11½	55	72	12	1647	22607	10276	14	1797	25176	11144
12	75	84	12	1625	25836	11744	14	1775	28019	12736

Table of Necessary Increased Pipe Diameters for Different Lengths

Length of Pipe	30 Ft.	60 Ft.	90 Ft.	120 Ft.	150 Ft.	180 Ft.	210 Ft.	240 Ft.	270 Ft.	300 Ft.
Diameter of Blower Outlet in inches	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be	Diameter of Pipe should be
3	3¼	3⅝	4	4¼	4½	4¾	5	5⅛	5¾	5½
3½	3¾	4⅞	4½	4⅞	5	5¼	5½	5⅝	5¾	6⅛
4	4⅜	4¾	5⅝	5¾	6	6⅜	6½	6⅞	6¾	7
4½	5	5⅝	5¾	6	6⅜	6¾	7	7¼	7½	7⅞
5	5½	6	6¾	6¾	7⅛	7½	7¾	8⅛	8¾	8¾
6	6½	7	7⅝	8	8½	9	9¾	9¾	10½	10½
7	7⅝	8¼	8⅞	9¾	10	10⅝	10⅞	11⅞	11¾	12⅞
8	8¾	9½	10½	10¾	11⅝	11⅞	12⅝	12¾	13¾	13¾
9	10	10¾	11½	12⅞	12¾	13⅝	14	14½	15⅞	15⅞
10	11	11⅞	12¾	13½	14¼	14⅞	15½	16⅞	16¾	17¾
11	12	13	13⅞	14¾	15⅝	16¾	17⅞	17¾	18½	19¾
12	13⅞	14¼	15¼	16⅞	17	17⅞	18⅝	19¾	20⅞	20¾
13	14¼	15⅝	16½	17½	18⅞	19¼	20⅞	21	21¾	22⅝
14	15⅝	16⅞	17¾	18⅞	19¾	20¾	21¾	22⅝	23¾	24¼
15	16½	17¾	19	20⅞	21¼	22¼	23¼	24¼	25⅞	26
16	17½	19	20¾	21½	22⅞	23¾	24¾	25⅞	26¾	27¾
17	17⅞	20¼	21½	22¾	24	25¼	26¾	27½	28½	29½
18	19¾	21¾	22¾	24¼	25½	26¾	27⅞	29½	30⅞	31¼
19	20⅞	22½	24	25½	27	28¼	29½	30¾	31⅞	33
20	22	23⅞	25¾	27⅞	28¾	29¾	31	3¼	33½	34¾
21	23	24⅞	26¾	28¼	29¾	31⅞	32⅞	34⅞	35¼	36¾
22	24⅞	26⅞	27⅞	29½	31⅞	32⅞	34⅞	35¼	36¾	38¼
23	25¼	27¼	29¾	30⅞	32½	34⅞	35⅞	37⅞	38½	39¾
24	26½	28½	30¾	32¼	34	35⅞	37¼	38¾	40¼	41⅞
Length of Pipe.....	30 ft.	60 ft.	90 ft.	120 ft.	150 ft.	180 ft.	210 ft.	240 ft.	270 ft.	300 ft.
Length of Mouth-piece	9 in	15 in	21 in	27 in	33 in	39 in	42 in	48 in	54 in	60 in

USEFUL INFORMATION

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find side of an equal square multiply diameter by .8862.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. standard) weighs 8 $\frac{1}{8}$ pounds and contains 231 cubic inches.

A cubic foot of water contains 7 $\frac{1}{2}$ gallons, 1,728 cubic inches, and weighs 62 $\frac{1}{2}$ pounds.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard horsepower: The evaporation of 30 pounds of water per hour from a feed water temperature of 100 degrees Fahrenheit into steam at 70 pounds gauge pressure.

To ascertain heating surface in tubular boilers multiply two thirds the circumference of boiler by length of boiler in inches, and add to it the area of all the tubes.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 percent for drilled holes.

To find the amount of air that can be produced by different size air cylinders: Find the area of cylinder, and multiply that by the stroke, then multiply the result by 2 if it is a Straight Line Compressor, by 4 if a Duplex Compressor, or by 2 if a Compound Duplex Compressor. Divide this result by 1,728, which will give amount of air per stroke, and then multiply by number of strokes per minute.

To find approximate weight of iron for round bars multiply the square of the diameter in inches by the length in feet, and that product by 26. The product will be the weight in pounds, nearly.

To find the approximate weight of iron for square and flat bars multiply the area of the end of the bar in inches by the length in feet, and then by 3.32. The product will be the weight in pounds, nearly.

To find the weight of cast iron balls when the diameter is given: Multiply the cube of the diameter by .1377.

To find the diameter of cast iron balls when the weight is given: Multiply the cube root of the weight by 1.936.

To find the weight of a spherical shell: From the weight of a ball of the outer diameter subtract the weight of one of the inner diameters.

To find the weight of grindstones: Square the diameter (in inches) multiplied by thickness (in inches) then by the decimal .06363. The product will be the weight of the stone in pounds.

Bars and Plates

Iron:	Multiply contents in cubic inches by	.27777	result will be weight in pounds.
Steel	" " " "	.28332	" " " "
Copper	" " " "	.32118	" " " "
Brass	" " " "	.3112	" " " "
Lead	" " " "	.41015	" " " "
Zinc	" " " "	.25318	" " " "
Tin	" " " "	.36562	" " " "
Aluminum	" " " "	.09375	" " " "

The circumference of a circle multiplied by .282 equals side of a square of same area. Useful in turning round tanks into square.

To find contents in gallons of a square vessel: Multiply number of cylindrical inches by .0034 for wine gallons, by .002785 for ale gallons.

To find contents in gallons of a vessel whose diameter is larger at one end than at the other: Multiply the largest diameter by the smaller in inches. Add one-third of the square of their difference, multiply that sum by the height, and multiply that product by .0034 for wine, or .002785 for ale gallons.

To find capacity of a four sided vessel in gallons: Find cubical contents by multiplying the length, breadth and height in inches and divide product by 231.

WEIGHTS AND MEASURES

Dry Measure

Struck Bushel.	Pecks.	Quarts.	Pints.	Gallons.	Cubic Inches.
1	4	32	64	8	2150.
	1	8	16	2	537.6
		1	2	0.25	67.2
		0.5	1	0.125	33.6
		4	8	1	268.8

A heap bushel= $1\frac{1}{4}$ struck bushels. The cone in a heap bushel must be not less than 6 inches high.

30 bushels make 1 chaldron.

Usually a barrel of U. S. Hydraulic Cement=300 to 310 pounds, and genuine Portland =425 pounds.

To change dry measure from U. S. to Imperial, divide by 1.032.

Cubic or Solid Measure

1728 cubic inches=1 cubic foot.

27 cubic feet=1 cubic yard.

A cord of wood (4'x4'x8')=128 cubic feet.

A perch of masonry 16.5'x1.5'x1' =24.75 cubic feet, but is generally assumed at 25 cubic feet.

1 cubic foot of water makes about 1700 cubic feet of steam.

1 cubic foot=four-fifths of a bushel.

Avoirdupois of Ordinary Commercial Weight

16 drams=1 oz.

16 oz. =1 lb.

100 lb. =1 cwt.

20 cwt. =1 ton.

28 pounds=1 quarter.

4 quarters or 112 pounds=1 cwt.

2240 pounds=1 long ton.

1 pound=27.7-10 cubic inches of distilled water at 39° Fahrenheit.

Measure of Length

4 In. make 1 Hand.

7.92 In. make 1 link.

18 In. make 1 cubit.

12 In. make 1 ft.

6 Ft. make 1 fathom.

3 Feet make 1 yard.

5½ Yds. make 1 rod or pole.

40 Poles make 1 furlong.

8 Fur. make 1 mile.

69 1-6 Miles make 1 degree.

60 Geographical miles make 1 degree.

1760 Yards, or 5280 feet, 1 mile.

Measure of Surface

144 Square inches make 1 square foot.

9 Square feet make 1 square yard.

30¼ Square yards make 1 rod, perch or pole.

40 Square rods make 1 square rood.

4 Square roods make 1 square acre.

10 Square chains make 1 square acre.

640 Square acres make 1 square mile.

Gunter's Chain equal to 22 yards or 100 links.

272¼ Square feet make 1 square rod.

43,560 Square feet make 1 acre.

36 Square miles (6 miles square)=one township.

Liquid Measure

4 Gills make 1 pint.

2 Pints make 1 quart.

4 Quarts make 1 gallon.

A gallon of liquid measure=231 cubic inches.

31½ Gallons make 1 barrel.

54 " " 1 hogshead.

252 " " 1 tun.

Different Colors of Iron, Caused by Heat (Pouillet)

Deg. Cen.	Deg. Fahr.	
261	502	{ Violet, purple, and dull blue, between 261 C. to 370 C. It passes to
370	680	{ bright blue, sea green, and then disappears.
500	932	{ Commences to be covered with a light coating of oxide; becomes a deal
		{ more impressive to the hammer and can be twisted with ease.
525	977	Becomes nascent red or just glowing in the dark.
700	1292	Sombre or dark red.
800	1472	Nascent cherry.
900	1657	Cherry red.
1000	1832	Bright cherry red.
1100	2012	Dull orange.
1200	2192	Bright orange.
1300	2372	White.
1400	2552	Brilliant white welding heat.
1500	2732	{
1600	2912	{ Dazzling white.
Light iron indicates impurity.		
The heaviest steel contains least carbon.		

Expanding and Contracting of Iron: All cast iron expands at the moment of becoming solid, and contracts in cooling; gray iron expands more and contracts less than other iron.

Tempering Steel

Color.	Purpose.	Tem. Fahr.	Alloys whose fusing point is same temperature.
Light straw	Turning tools for metal	430	1 tin to 1¾ lead
Dark straw	Wood tools, taps and dies	470	1 tin to 2½ lead
Brown yellow	Hatchets, chipping chisels	500	1 tin to 4¾ lead
Dark purple	Springs, etc.	550	1 tin to 12 lead

Average Temperatures Under Different Conditions

	BESSEMER PROCESS.	Centigrade	Fahrenheit
		Degrees.	Degrees.
Running the slag		1580	2876
Running steel into ladle		1640	2984
Running steel into mold		1580	2876
Annealing furnace, ingot in.....		1200	2192
Ingot under hammer		1080	1976

OPEN HEARTH PROCESS.

Gas from producers	720	1238
Gas entering generator	400	752
Gas leaving generator.....	1200	2192
Air leaving generator	1000	1832
Fumes passing to shaft	300	572
End of fusion of charge	1420	2588
Refining the steel	1500	2732
Running into ladle, first	1580	2876
Running into ladle, last	1490	2714

BLAST FURNACE—GRAY BESSEMER.

Front of tuyere	1930	3506
At tapping	1570	2858

Strength of Iron

The mean strength of American wrought iron is 45,900 lbs.; English 43,900. Ultimate extension of iron is 600th part of its length. The working strain is from 1-6 to ¼ the mean strength.

Resistance to flexure actions evenly over the surface, equals ½ the tensile strength. Bars of wrought iron will expand or contract 151200th of their length for each degree of heat. With range of temperature of this country (minus 20 to plus 120°) = 140°, will expand or contract 1080th part of its length, equal to the force of 20740 lbs., or 9¼ ton per sq. inch section. Tensile strength increases, in from 1 to 6 reheatings and rollings from 43904 lbs., to 60824 lbs., and in from 6 to 12, is reduced again to 43904.

Melting Point, Weight per Cubic Foot, Weight per Cubic Inch, Tensile Strength and Specific Gravity of Metals

The following table has been made after consulting various authorities. While not entirely correct, it is sufficiently so for comparison.

Name.	Melting point. Degrees.	Weight cu.ft. in lbs.	Weight cu. inch. in lbs.	Tensile strength per sq. inch.	Specific gravity.
Aluminum	1300	162	.089	23,000	2.600
Alum, Bronze (10 percent) ...	1700	485	.280	80,000	7.560
Ajax Metal	1850	545	.315	{ Cast 38,000 { Wire 96,000	8.400
Antimony	790	418	.244	1,000	8.710
Brass, common	1500—1900	539	.312	{ Cast 20,000 { Wire 49,000	8.300
Bronze	1850	545	.315	{ Cast 32,000 { Wire 65,000	8.400
Bismuth	518	616	.355	Cast 3,200	9.900
Copper	1850	550	.318	{ Cast 22,500 { Wire 60,000	8.600
“ Wire		555	.32	{ Wire 60,000 { Cast 37,500	8.800
Crown Bronze	1850	545	.315	{ Cast 37,500 { Wire 90,000	8.400
Glass	1600—2300	180	.180		3.000
Gun Metal (9 copper, 1 tin) ..	1850	545	.315	{ Cast 32,000 { Wire 90,000	8.400
Iron, Cast (Average)	2700	450½		16,000—23,500	6.210
Iron, Pig (Average)	2200—3000			{ 1st. melting 18,000 { 2nd. “ 20,000 { Plates 52,000	
Iron, Wrought	3800	480½	.280	{ Bar, best 58,000 { Wire 95,000	7.698
Iron, Wrought (welding)	2400				
Lead	620	712	.410	{ Cast 1,800 { Pipe 2,100	11.330
Manganese Bronze	1800	525	.300	{ Cast 57,000 { Rolled 105,000	8.400
Nickel	2900	1342	.299		8.100
Phosphor Bronze	1850	550	.320	{ Cast 38,500 { Wire 96,000	8.500
Platinum	4500	1342	.761	Wire 53,000	21.842
Steel	2550	490	.286	{ Plates 60,000 { Wire 120,000	7.919
Tin	512	459	.264	{ Cast 4,600 { Wire 7,000	7.300
Zinc	775	424	.248	{ Cast 2,900 { Wire 20,000	6.860

WEIGHT AND STRENGTH OF METALS

Comparative Weight of Metals

METALS.	Weight per square foot one inch thick.	Heavier than iron.	Lighter than iron.	Kind of metals.	Length of a bar able to sup- port its own wt. in. ft.
Iron, rolled	40.000			Cast iron	5.351
Steel “	40.833	2 percent		Hard structural steel...	23.040
Aluminum, rolled	14.126		62.91 percent	Aluminum	23.040
Brass, rolled	43.68	7 percent			
Copper “	46.51	13 “		Ordinary bronze	9.893
Gold “	100.8	150 “			
Lead “	59.80	50 “		Wrought iron	15.000
Nickel “	43.2	7 “			
Silver “	54.75	36½ “			
Tin “	38.	5 “			
Zinc “	37.6	66 “			

STRENGTH OF MATERIALS

Ultimate Resistance to Tension

In Pounds Per Square Inch

METALS AND ALLOYS.		AVERAGE.
ALUMINUM BRONZE.		
10 percent Al. and 90 percent copper.....		85000
1¼ " " " " 98¾ " "		28000
Brass, cast		18000
" wire		49000
Bronze or gun metal.....		30000
Copper, cast.....		19000
" sheet		30000
" bolts		36000
" wire, (unannealed)		60000
Iron, cast, 13,400 to 29,000		16500
" wire, black or annealed		56000
" " bright, hard drawn		78400
Lead, sheet		3300
Steel	45000 to	120000
" Aluminum, 2 1-5 percent Aluminum		70000
" copper, 35 percent copper		60000
" nickel, 3¼ percent nickel		86000
" cast, wire, crucible		224000
" " " Bessemer		89600
" " " high carbon		179200
" " " Mild. O. H.		134000
The modulus of elasticity of steel from recent tests is from 27,000,000 to		31,000,000.
Average, 29,000,000.		
Tin, cast		4600
Zinc		7000 to 8000

Ultimate Resistance to Compression.

Metals

Brass, cast.....	10300
Iron	85000 to 125000
Steel	45000 to 120000

Ultimate Resistance to Shearing.

Metals

Iron, cast	25000
Steel	50000

Shrinkage of Castings

In making allowance for shrinkage in casting, pattern makers understand that different shapes will shrink differently. The standard table of allowance for shrinkage in use in the best shops in the country is as follows:

For Loam castings	1-12 inch per foot.
" Green sand castings	1-10 " " "
" Dry	1-10 " " "
" Brass castings	3-16 " " "
" Copper	3-16 " " "
" Tin	1-4 " " "
" Bismuth	5-32 " " "
" Zinc	5-16 " " "
" Lead	5-16 " " "

To Test the Quality of Iron

If fracture gives long, silky fibres of leaden gray hue, fibres cohering and twisting together before breaking, it may be considered a tough, soft iron. A medium even grain mixed with fibres, a good sign; a short, blackish fibre indicating badly refined iron. A very fine grain denotes a hard, steady iron apt to be cold short, hard to work with a file. Coarse grain with a brilliant crystallized fracture, yellow or brown spots denotes a brittle iron, cold short working easy when heated, welds easily. Cracks on the edge of bars, sign of hot short iron. Good iron is readily heated, soft under the hammer, and throws out but few sparks. All iron contains more or less carbon, the hardest the most.

Breaking Strength of and Power Transmitted by Wire Ropes (42 Wire)

Diameter of Ropes, inches.	Diameter of Pulleys, feet.	Revolutions per minute.	Breaking stress of Rope per pound.	Horsepower Transmitted.	Velocity of Rope in feet per second.
7-16	5	100	4,260	8.6	26
15-32	6	100	5,660	13.4	31
1-2	7	100	8,200	21.1	39
5-8	8	100	11,600	27.5	42
5-8	8	120	11,600	33.0	50
5-8	9	100	11,600	51.9	47
5-8	9	120	11,600	62.2	56
11-16	10	100	15,200	73.0	52
11-16	10	120	15,200	87.6	62
11-16	10	140	15,200	102.2	73
11-16	12	100	15,200	116.7	63
3-4	12	120	17,600	148.9	75
3-4	12	140	17,600	173.7	87
3-4	14	100	17,600	185.0	73
3-4	14	120	17,600	222.0	87
3-4	15	120	17,600	300.0	94

To Preserve Wire Rope

To preserve wire rope from wear or exposure, cover it thickly with linseed oil or with paint formed of equal parts linseed oil and Spanish brown or lampblack. If used under water or under ground, the best preservative is made by adding to one barrel of tar one bushel of fresh slacked lime, boil well and while hot saturate the rope. Sawdust or oatmeal is sometimes added with good effect.

TERMS APPLIED TO ELECTRICAL UNITS

The electric units are as follows:

VOLT—The unit of electrical motive force. Force required to send one ampere of current through one ohm of resistance.

OHM—Unit of resistance. The resistance offered to the passage of one ampere when impelled by one volt.

AMPERE—Unit of current. The current which one volt can send through a resistance of one ohm.

COULOMB—Unit of quantity. Quantity of current which, impelled by one volt, would pass through one ohm in one second.

FARAD—Unit of capacity. A conductor or condenser which will hold one coulomb under the pressure of one volt.

JOULE—Unit of work. The work done by one watt in one second.

WATT—The unit of electrical energy, and is the product of ampere and volt—that is, one ampere of current flowing under a pressure of one volt, gives one watt of energy.

One electrical horsepower is equal to 746 watts.

One kilowatt is equal to 1,000 watts.

To find the watts consumed in a given electrical circuit, such as a lamp, multiply the volts by the amperes.

To find the amperes, divide the watts by the volts.

To find the electrical horsepower required by a lamp, divide the watts of the lamp by 746.

To find the number of lamps that can be supplied by one electrical horsepower of energy, divide 746 by the watts of the lamp.

To find the electrical horsepower necessary, multiply the watts per lamp by the number of lamps and divide by 746.

To find the mechanical horsepower necessary to generate the required electrical horsepower, divide the latter by the efficiency of the generator.

To find the amperes of a given circuit, of which the volts and ohms resistance are known, divide the volts by the ohms.

To find the volts when the amperes and watts are known, multiply the amperes by the ohms.

To find the resistance in ohms when the volts and amperes are known, divide the volts by the amperes.

Valuable Practical Receipts and Compositions

PLUMBER'S SOLDER—Tin, 2 pounds, lead, 5 pounds.

HARD SOLDER—Copper, 1 pound, zinc, 8 ounces.

YELLOW SOLDER—Copper and zinc, equal parts.

YELLOW BRASS—Zinc, 10 pounds, lead, 4 ounces, copper, 24 pounds.

BRONZE METAL—Antimony, 1 pound, tin, 100 pounds, copper, 2 pounds.

SILVER COLORED METAL—Tin, 50 pounds, bismuth, 1 pound, antimony, 3 pounds, copper, 3 pounds.

IMITATION SILVER—Copper, 4 pounds, zinc, 4 ounces.

WHITE METAL—Copper, 5 pounds, zinc, 3 pounds, lead, 1 pound, tin, 1 pound.

METAL FOR TAKING IMPRESSIONS—Bismuth, 3 pounds, lead, 1 pound, tin, 8 ounces.

RIVET METAL—Tin, 5 pounds, zinc, 2 pounds, copper, 10 pounds.

TINNING ACID for BRASS or COPPER—Muriatic acid, 1 pound, give it all the zinc it will dissolve: add 4 ounces of sal ammoniac, 1 pint water.

FOR TINNING BRASS—Water, 4 gallons, salt, 1 pint, cream tartar, 1 pound.

MIXTURE for SILVERING METALS—Dissolve 2 ounces of silver in 3 grains of corrosive sublimate, add salt, 8 quarts, tartaric acid, 4 pounds.

To Separate SILVER from COPPER—Sulphuric acid, one part, nitric acid, one part, water, one part, then boil the metal in the mixture until it dissolves; add a little salt and the silver will subside.

COMMON PEWTER—Tin, 4 pounds, lead, 1 pound.

QUEEN'S METAL—Tin, 9 pounds, antimony, 1 pound, lead, 1 pound, bismuth, 1 pound.

MOCK PLATINUM—Copper, 4 pounds, zinc, 18 pounds.

TYPE METAL—Lead, nine parts, antimony, two parts, bismuth, two parts.

CEMENT FOR STOPPING HOLES IN CAST IRON—National Iron Filler Cement mixed with water until it is about the consistency of common paste, then it is ready for use. It should be kept in a dry place.

Proportions of Various Compositions in Common Use

In 100 Parts

BABBITT METAL—Tin, 89, copper, 3.7, antimony, 7.3.

FINE YELLOW BRASS—Copper, 66, zinc, 34.

GUN METAL VALVES—Copper, 90, tin, 10.

WHITE BRASS—Copper, 10, zinc, 80, tin, 10.

GERMAN SILVER—Copper, 33.3, zinc, 33.4, nickel, 33.3.

CHURCH BELLS—Copper, 30, zinc, 5.6, tin, 10.1, lead, 4.3.

GONGS—Copper, 81.6, tin, 18.4.

LATHE BUSHES—Copper, 80, tin, 20.

MACHINERY BEARINGS—Copper, 87.5, tin, 12.5.

SHEATHING METAL—Copper, 56, zinc, 44.

Safe Pressure on Bearings and Slides

KIND OF JOURNAL BEARING.

Pressure per Sq. In.
of Projected Area, p.

Bearings on which the load is intermittent and the speed slow, such as	
crank-pins of shearing machines	3,000 pounds.
Cross-head neck journals	1,300 "
Crank-pins of large, slow speed engines	800—900 "
Crank-pins of marine engines, usually	400—500 "
Main crank-shaft bearings—marine engines (slow)	600 "
Main crank-shaft bearings—marine engines (fast)	400 "
Locomotive driving-axle journal	180—350 "
Railway journals	200 "
Fly-wheel shaft journals	150—250 "
Small engine crank-pins	150—200 "
Slipper slide blocks, marine engines	100 "
Stationary engine slide blocks	25—125 "
Stationary engine slide blocks, usually	30—60 "
Propeller thrust bearings	50—70 "
Shaft in cast iron steps or seats	15 "

USEFUL RULES AND TABLES

$$\text{H. P.} = \frac{\text{P} - \text{L} - \text{A} - \text{N}}{33,000}$$

P—Pounds Pressure per Square Inch

L—Length of Stroke in Feet

A—Area of Piston in Square Inches

N—Number Revolutions per Minute

Horsepower

Horsepower is an amount of mechanical force capable of raising 33,000 pounds one foot high, per minute.

Rule to find Horsepower of an Engine

Area of piston in inches, multiply by pressure per square inch, multiply by speed of piston in feet per minute, and that product divided by 33,000.

The pressure per square inch should be the mean pressure throughout the stroke exerted on the piston, which can be found by attaching an indicator to the engine. The result will be what engineers term indicated horsepower.

For the net effective horsepower, deduct from the above about one-quarter for friction of the working parts.

When the indicator is not used, and in the calculation the boiler pressure is substituted for the mean effective pressure, deduct from the result obtained from 40 to 60 per cent. for loss by condensation and friction of steam in pipes and passages, decrease of pressure in cylinder due to expansion, back pressure of exhaust, and friction of the working parts.

For engines from 20 to 60 horsepower, an average of 50 per cent. may be deducted; for smaller engines more.

The mean pressure in the cylinder when cutting of at

1-4 stroke equals boiler pressure multiplied by	.597
1-3 " " " " " "	.670
3-8 " " " " " "	.743
1-2 " " " " " "	.847
5-8 " " " " " "	.919
2-3 " " " " " "	.937
3-4 " " " " " "	.966
7-8 " " " " " "	.992

The horsepower of boilers is best defined by the heating surface of a boiler and is different according to their construction. A tubular boiler will give one horsepower to every 15 square feet of heating surface; a flue boiler every 12 square feet, and a cylinder boiler 10 square feet gives one horsepower. There is no standard law governing the horsepower of steam boilers, but this rule is adopted by most experts as a fair rating.

One cubic foot of water evaporated per hour=1 nominal horsepower.

7 1-2 pounds of coal consumed per hour will evaporate 1 cubic foot of water=1 horsepower.

1 square foot of grate will consume on average 12 pounds of coal per hour=1 6-10 horsepower.

A theoretically perfect steam engine consumes 66-100 pounds of coal per hour, per horsepower.

Marine condensing engines consume 2 to 6 pounds of coal per horsepower.

Fuel

1 pound of coal will evaporate from 7 to 10 pounds of water.

1 " dry pine wood " " 4 to 5 " " "

1 ton of anthracite coal requires a space of 42 cubic feet.

1 " bituminous " " " 44 " "

1 " coke " " 80 " "

150.35 cubic feet of air are required for the combustion of 1 pound of coal.

Belting

Horsepower of a belt velocity in feet per minute, multiplied by the width the product divided by 1,000.

1 in. single belt moving at 1,000 feet per minute 1 H. P.

1 in. double " " " 700 " " 1 H. P.

It is desirable that the angle of the belt with the floor should not exceed 45. It is also desirable to locate the shafting and machinery so that the belts should run off from each shaft in opposite directions, as this arrangement will relieve the bearings from the friction that would result when the belts all pull one way on the shaft.

The diameter of the pulleys should be as large as can be admitted.

The pulleys should be a little wider than the belt required for the work.

Belts should be kept soft and pliable. For this purpose blood warm tallow, dried in by the heat of fire or the sun, is advised. Castor-oil dressing is also good.

If possible to avoid it, connected shafts should never be placed one directly over the other, as in such case the belt must be kept very tight to do the work. For this purpose belts should be carefully selected of well stretched leather.

Table of Arch Brick

Inside Diameter.	No. 3 Arch.	No. 2 Arch.	No. 1 Arch.	Square.	Total.
0 ft. 6 in.	18.	.....	.....	.....	18.
1 " 0 "	13.	13.	.....	.....	26.
1 " 6 "	4.	29.	.....	.....	33.
2 " 0 "		41.4691	.....	.....	41.4691
2 " 6 "		31.	17.9071	.....	49.
3 " 0 "		21.	36.	.....	57.
3 " 6 "		10.3673	54.	.....	64.
4 " 0 "			72.	.....	72.
4 " 6 "			72.	7.5398	80.
5 " 0 "			72.	15.	87.
5 " 6 "			72.	23.	95.
6 " 0 "			72.	30.	102.
6 " 6 "			72.	38.	110.
7 " 0 "			72.	45.	117.
7 " 6 "			72.	53.	125.
8 " 0 "			72.	60.	132.
8 " 6 "			72.	68.	140.
9 " 0 "			72.	75.	147.
9 " 6 "			72.	83.	155.
10 " 0 "			72.	90.	162.
10 " 6 "			72.	98.	170.
11 " 0 "			72.	105.	177.
11 " 6 "			72.	113.	185.
12 " 0 "			72.	121.	193.

Table of Wedge Brick

Inside Diameter.	No. 2 Wedge.	No. 1 Wedge.	Square.	Total.
2 ft. 0 in.	.....	.....	.....	.....
2 " 6 "	60.3187	.....	.....	60.3187
3 " 0 "	48.	19.6835	.....	68.
3 " 6 "	36.	40.	.....	76.
4 " 0 "	24.	59.	.....	83.
4 " 6 "	12.0637	79.	.....	91.
5 " 0 "	.....	98.	.....	98.
5 " 6 "	.....	98.	7.5398	106.
6 " 0 "	.....	98.	15.	113.
6 " 6 "	.....	98.	23.	121.
7 " 0 "	.....	98.	30.	128.
7 " 6 "	.....	98.	38.	136.
8 " 0 "	.....	98.	46.	144.
8 " 6 "	.....	98.	53.	151.
9 " 0 "	.....	98.	61.	159.
9 " 6 "	.....	98.	68.	166.
10 " 0 "	.....	98.	76.	174.
10 " 6 "	.....	98.	83.	181.
11 " 0 "	.....	98.	91.	189.
11 " 6 "	.....	98.	98.	196.
12 " 0 "	.....	98.	106.	204.

SPECIFIC GRAVITY OF VARIOUS SUBSTANCES

NAMES OF SUBSTANCES.	Av. wt.		NAMES OF SUBSTANCES.	Av. wt.	
	Spec.	lbs. per Gravity. cu. ft.		Spec.	lbs. per Gravity. cu. ft.
Aluminum, cast	2.60	162	Lime	2.30—3.20	
Aluminum, hammered	2.75		“ slacked, ground	1.30—1.40	
Anthracite	1.40—1.70		“ quick, ground loose or in		
“ solid, of Pennsylvania	93		“ small lumps	53	
“ broken, loose	54		“ quick, ground loose thoroughly		
“ “ moderately shaken	58		“ shaken	75	
“ heaped bushel, loose	(80)		Limestone	2.46—2.84	168
Ash	.825	52.80	“ loose in irregular fragments		96
Asphaltum	1.10—1.20	87	Magnesium	1.74	109
Beech	0.85	53	Mahogany, spanish, dry	0.59—1.09	53
Brass, cast	.8.40—8.70	504	“ Honduras, dry		35
“ rolled	.8.57	524	Maple, dry	0.70	49
Brick	1.90	118	Marble	2.52—2.85	
Brick, common hard	1.53—2.30	125	Masonry, stone, dry	2.00—2.55	
Cedar	5.61		“ of granite or limestone, well		
Cement, gound, loose	1.85	35.06	“ dressed	165	
“ hydraulic, ground, loose,			“ of mortar rubble	154	
“ American, Rosendale	56		Masonry, brick, dry	1.56—1.60	
Cement, hydraulic, ground, loose,			“ of dry rubble	138	
“ American, Louisville	50		Mercury at 32° Fahrenheit	13.596	849
Cement, hydraulic, ground, loose,			Mica	2.80	183
“ English, Portland	90		Oak, dry	0.69—1.03	59
Charcoal	0.44		“ white, dry	50	
“ birch	34		“ other kinds	32—45	
“ fir	28		“ (old)	1.170	73.10
“ oak	21		Petroleum at 59° Fahrenheit	6.80	55
Green timbers usually weigh from one-			Pine	0.25—0.60	
fifth to one-half more than dry.			“ white, dry	25	
Cherry, dry	0.76—0.84	42	“ yellow, Northern	34	
Clay, dry	1.80—2.60	119	“ “ Southern	45	
“ lump, loose	1.93	121	Plaster of paris. (average)	2.00	125
Coal, bituminous, solid	1.20—1.50	84	Platinum, cast	21.15	13.42
“ “ broken, loose	49		“ hammered	21.3—21.15	
“ “ heaped bushel, loose.	(74)		Quartz, common, pure	2.5—2.80	165
Coke, loose, of good coal	0.55	26.3	Sand	1.80	113
“ “ heaped bushel	(40)		Sand, fine, dry	1.40—1.65	90—106
Concrete	2.47		“ wet	1.90—2.05	120—140
“ in cement	137		“ coarse	1.40—1.50	
“ ordinary	119		Sandstone	2.20—2.50	151
Copper, cast	8.79	542	Silver, cast	10.48	655
“ rolled	8.78—9.00	548	“ hammered	10.62	
Earth, humus	1.30—1.80		Slate	2.60—2.75	175
“ common, loam, dry, loose	76		Spruce	.50	31.25
Earth, common, loam, dry moder-			Snow, fresh fallen	0.19	5—12
ately rammed	95		Soil (common)	2.13	133
“ as a soft flowing mud	108		Steel	7.26—7.86	490
Ebony, (American)	1.331		Stone (common)	2.52	158
Emery	4.00	250	Sulphur	1.93—2.07	125
Glass, common window	2.64	157	Tin, cast	7.20	459
“ plate	2.80	175	“ rolled	7.30	
Gnciss, common	2.40—2.70	168	Water, pure rain or distilled at 39°		
Gold, cast, pure or 24 carat	19.28	12.04	“ Fah.	1.00	
“ Pure-hammered	19.33	12.17	“ pure rain or distilled at 60°		
Granite	2.50—3.00	170	“ Fah. (Standard temp.)	62.35	
Gypsum, cast, dry	0.97	142	Water, sea	1.03	64
Ice	0.88—0.92	58.7	Walnut wood, dry	0.60—0.81	51
Iron, cast	7.10—7.50	450.5	Wax, bees	0.95—0.98	60.5
“ wrought	7.79	486½	Zinc, cast	6.90	437.5
Lead	11.37	712	“ rolled	7.20	
Lignum vitæ	1.333	83.19			

HANDY REFERENCES FOR FOUNDRYMEN

Weight of Earths, Rocks, etc.

Weight of cu. yd. of Sand	about 30 cwt.
Gravel	30 "
Marl	26 "
Clay	31 "
Chalk	36 "
Sandstone	39 "
Shale	40 "
Quartz	41 "
Granite	42 "
Trap	42 "
Slate	43 "

Earth and clay increase in bulk 1-4 when dug, but subside 1-5 in height and decrease 1-6 in bulk when formed into embankments.

Sand and gravel increase in bulk 1 1-12, when dug. Sand subsides in embankment 1-4 in height; Gravel from 1-10 to 1-12, according to coarseness.

Rock increases 1-2 of its original bulk when excavated.

From six hundred to eight hundred pounds of fire clay is enough to lay one thousand brick. Generally, the clay should be soaked and mixed thin, then the brick should be dipped and rubbed close.

All brick work should be warmed up slowly to expel moisture, before applying severe heat. It requires seven brick to lay one square foot of four and one-half inch wall, fourteen brick for one square foot of nine-inch wall, and twenty-one brick for one square foot of thirteen-inch wall.

One thousand brick, closely stacked, occupy about fifty-six cubic feet, one thousand old bricks, cleaned and loosely stacked, occupy about seventy-two cubic feet.

Quantities of Earth Equal to a Ton

Sand, river, as filled into carts	21 cubic feet.
Sand, pit	22 " "
Gravel, coarse	23 " "
Marl	28 " "
Clay, stiff	28 " "
Chalk, lump	29 " "
Earth, mold	33 " "

HANDY RECEIPTS FOR FOUNDRYMEN

To Compute the Weight of Cast Iron

Ascertain the number of cubic inches in the pieces, and multiply by .2607, and the product will be the weight in pounds.

To Prevent Iron From Rusting

Warm it, then rub with white wax, put it again to the fire until the wax has pervaded the entire surface, or immerse tools or bright work in boiled linseed oil and allow it to dry on them.

Stone and Iron

When stone and iron are to be cemented together, use a compound of equal parts of pitch and sulphur.

Coppering Iron

Iron can be coppered by dipping it into melted copper, the surface of which is protected by a melted layer of cryolite and phosphoric acid, the articles thus treated being heated to the same temperature as the melted copper.

To Harden Cast Iron

Many times it is very convenient to make an article of cast iron that needs to be finished, and which should be very hard. Cast iron can be hardened as easily as steel, and to such a degree of hardness that a file will not touch it. Take one-half pint of vitriol, one peck of common salt, one-half pound saltpeter, two pounds of alum, one-quarter pound prussic potash, one-quarter pound cyanide of potash, all to be dissolved in ten gallons of soft water. Be sure that all the articles are dissolved. Heat the iron to a cherry red and dip it in the solution. If the article needs to be very hard, heat and dip the second time, and even the third time.

Annealing Cast Iron

To anneal cast iron, heat it with a slow charcoal fire to a dull red heat, then cover it over about two inches with fine charcoal, then with ashes; let it lie until cold. Hard cast iron can be softened enough in this way to be filed or drilled. This process will be exceedingly useful to iron foundries, as by this means there will be a great saving of expense in making new patterns.

Case Hardening

Place horn, hoof, bone dust, or shreds of leather, together with the article to be case hardened in an iron box subject to a blood red heat, then immerse the article in cold water.

Case Hardening with Prussiate of Potash

After polishing heat the article to a bright red, rub the surface over with prussiate of potash, allow it to cool to a dull red, and immerse it in water.

Glue to Resist Moisture

1 pound of glue melted in 2 quarts of skim milk.

Marine Glue

1 of Indian Rubber, 12 mineral naphtha or coal tar. Heat slowly, mix, and add 20 powdered shellac. Pour out on a slab to cool. When used, to be heated to about 250.

Liquid Glue

Glue, water and vinegar, each two parts. Dissolve in water bath, and add alcohol, 1 part.

Lacquers Used to Preserve Polishes on Brass

Lacquers are ordinarily of two kinds: alcohol and products of alcohol.

Good alcohol lacquers consist of shellac, and gums of various sorts, to produce colored effects, and are applied by heating the brass.

The lacquer most commonly used is made by dissolving 1 ounce of soluble cotton in a quart of amylacetate and thinned with mixture of amylacetate and fusel oil to consistency desired.

Brazing

The edges filed or scraped clean and bright, covered with spelter and powdered borax, and exposed in a clear fire to a heat sufficient to melt the solder.

To Remove Rust from Steel

Steel which has been rusted can be cleaned by brushing with a paste composed of 1-2 ounce cyanide potassium, 1-2 ounce castile soap, 1 ounce whiting, and water sufficient to form a paste. The steel should be washed with a solution of 1-2 ounce cyanide potassium in 2 ounces water.

To Preserve Steel from Rust

1 Caoutchouc, 16 turpentine, dissolve with a gentle heat, then add 8 parts boiled oil. Mix by bringing them to the heat of boiling water, apply to the steel with a brush, in the way of varnish. It may be removed with turpentine.

Annealing Steel

For small pieces of steel, take a piece of gas-pipe two or three inches in diameter, and put the pieces in it, first heating one end of the pipe, and drawing it together, leaving the other end open to look into. When the pieces are of cherry-red, cover the fire with sawdust, use a charcoal fire and leave the steel in over night.

In Turning Steel or Other Hard Metal

Use a drip composed of petroleum two parts and turpentine one part. This will insure easy cutting and perfect tools when otherwise the work would stop, owing to the breakage of tools from the severe strain.

Tempering Recipes

Rosin, 2 pounds, tallow, 2 pounds, pitch, 1 pound. Melt together and dip the hot steel in it. Salt, 1-2 cupful, saltpeter, 1-2 ounce, alum, pulverized, 1 teaspoonful, soft water, 9 gallons. Never heat above a cherry red nor draw any temper.

By melting together 1 gallon spermacetti oil, 2 pounds tallow, and 1-4 pound wax, a mixture is obtained very convenient for tempering any kind of steel article of small size. Adding 1 pound rosin makes it suitable for larger articles.

To Solder Without Heat

Brass filings, 2 ounces, steel filings, 2 ounces, Fluoric acid, 1-4 ounce. Put the filings in the acid, apply the solution to the parts to be soldered. After thoroughly cleaning the parts in contact, then dress together. Do not keep the fluoric acid in glass bottles, put in lead or earthen vessels.

To Soften Steel

Cover it with clay, heat to a cherry red in a charcoal fire, and let cool over night in the fire.

To Temper Steel very Hard

Water, 4 parts, flour, 1 part, salt, 2 parts, mixed to a paste. Heat the steel until a coating adheres when dipped into the mixture, then heat to a cherry red and cool in cold soft water. The steel will come out white and very hard.

To Temper Steel on One Edge Only

Dip the edge to be tempered into hot lead until proper color, then temper in ordinary fashion.

To Drill Hardened Steel

Cover your steel with melted beeswax, when coated and cold, make a hole in the wax with a fine pointed needle or other article the size of holes you require, put a drop of strong nitric acid upon it, after an hour rinse off and apply again, it will gradually eat through.

A mixture of 1 ounce of sulphate of copper, 1-4 ounce of alum, 1-2 teaspoonful of powdered salt, 1 gill of vinegar and 20 drops of nitric acid will make a hole in steel that is too hard to cut or file easily.

A small hole drilled at the end of a crack in sheet steel will stop it from growing larger.

Obermayer's Telegraph Code

IN REFERENCE TO

ORDERS, SHIPMENTS, TERMS AND DISCOUNTS

Questions Regarding Purchasing

At what price can you ship?	Badge
At what price and how soon can you ship?	Bait
What quantity can you ship?	Breed
How soon can you ship?	Balk
Can you furnish from stock, if not, how long will it take to make?	Bank
How many have you in stock?	Band
How long will it take to make and ship?	Bark
When will you ship our order?	Baron
Telegraph immediately price F. O. B. factory	Beach
Name freight rate from your factory to our city	Beadle
Your offer acceptable, execute order	Beaver
When did you ship our order?	Beat
What is the best you can do?	Beckon
Can you ship promptly?	Berth
At what discount will you sell	Better
Can you do better?	Bernet
To be delivered in this city	Bid
See letter	Big
Please reply immediately by telegram	Block
Get through rate of freight	Blow
If so enter our order	Bow
Will you accept order?	Bond
Will you accept order from?	Brag
On what basis should order be accepted?	Brush

Answers Regarding Purchasing

We can ship	Cab
We can ship today	Cabin
We can ship tomorrow	Cadet
We have all in stock and can ship at once	Canoe
We have in stock and can ship it	Capon
We can ship before	Case
We have only——but will ship the other size promptly	Can
We have none in stock	Cat
We can ship part from stock, the balance	Card

Answers Regarding Purchasing—Continued

Impossible for us to fill your order in the time specified	Cap
We have none in stock, but can ship from factory	Cater
None of the goods you order are in stock	Cargo
If ordered immediately	Chic
Immediately on receipt of order	Choke
On receipt of order	Chess
After receipt of order	Chat
Will ship earlier if possible	Clear
We can promise definitely	Coal
We can quote you discount on	Clay
We can change present discount	Clock
For immediate acceptance	Coast
For acceptance within	Clamp
Delivery in your city	Coat
Price as per our recent quotation	Cog
Price as per our last invoice	Coach
Can not send exactly what you order	Cob
Shall we substitute?	Coax
Free on board at	Comb
Less freight allowance per 100 pounds of	Cold
We have entered your order for	Colony
We will accept order	Child
We do not sell	Consist
In less than	Consul
Please specify sizes	Copy
Your telegram is not clear, please repeat	Cool
We cannot secure rate to	Cost
Reply immediately by our code	Crown
Subject to immediate reply by wire	Crop
Please wire reply to our telegram of	Coil

Phrases for Ordering

Wanted at once, when will you ship? Answer by telegraph	Duet
Enter order for	Duty
Duplicate order	Drum
Ship at once any portion of order	Draw
Hasten shipment of	Down
We are entirely out	Drawn
We must have	Debit
Order of the	Dry
If not already executed cancel	Dock
Cancel balance of order	Docket
Cancel order unless shipped by	Diver
Ship what you have ready and balance as soon as possible	Doctor

Phrases for Ordering—Continued

Ship via rail	Dean
Ship via canal	Debate
Ship via fast freight	Dear
Ship via river	Deck
Ship via express	Deed
Ship via cheapest route	Degree
Ship via quickest route	Dial
Ship to-day sure	Do
Ship as soon as possible	Dod

Questions: Orders and Shipments

When can you ship?	Echo
When will you ship?	Electro
If not, when will you ship?	Error
Have you shipped order?	End
Have you shipped us any?	Eddy
Shall we ship the sizes we have in stock	Ebony
Shall we enter order?	Edify
Please send shipping instructions	Educate
Shall we ship from Chicago or Pittsburg factory?	Emblem
Shall we ship from Cincinnati?	Enlist
Shall we ship from Larimer?	Epoch
Shall we ship from Harvey by express or by freight	Excess
Shall we make shipment C. O. D.	Essay
Have you entered order and when will you ship	Esteem

Answers: Orders and Shipments

We will ship	Fairy
We will ship at once	Fad
We will ship on	Fade
We will try to ship	Field
We have shipped	Find
We have shipped per	Fault
We shipped your order on	Firm
We expect to ship on the	Forge
We have not shipped	Foam
We will hold order for the——shall we ship balance without them	Flood
We cannot secure car immediately	Foundry
We will not ship until we hear further from you	Full

Questions Regarding Forwarding, Tracing, Etc.

Trace quick goods on invoice of	Ibex
Duplicate and ship at once goods on invoice of	Idea
Trace following goods short on invoice of	Ignore
Duplicate and ship quick following goods short on invoice of	Induce
Advise quick waybilling reference to invoice of	Island
Advise quick date of forwarding routing, car number and initial, in-voice of	Ivy

Answers Regarding Forwarding, Tracing, Etc.

We are tracing goods on invoice of	Jab
We will duplicate and ship at once, invoice of	Jade
We are tracing goods reported short on invoice of	Jangle
We will duplicate and ship immediately, goods reported short on in-voice of	Jail
Following is waybilling reference to invoice of	Jamb
Following is date of forwarding routing, car number and initial, in-voice of	Jasper

Phrases Regarding Time

We will ship immediately	Hack
Last of this week	Habit
Early next week	Hope
Last of next week	Happy
First week in	Heap
We will ship to-morrow	Hand
Second week in	Heed
About the middle of	Hear
Within three days	Hold
Within four days	Hood
Within five days	Heron
Within one week	Hide
Within ten days	Honor
Within two weeks	Horn
Within three weeks	Hero
Within four weeks	Horse
Within two months	Hedge

TERMS

Net cash thirty days	Kid
Net cash sixty days	Knock
Draft attached to bill of lading	Knead
Less 2 percent if paid in ten days	Keel
Less 1 percent if paid in ten days	Knit
Usual terms	Kill
60 days 2 percent cash 10 days	Kuhn

Discounts (Percent)

1	percent	Gale
2	"	Gave
2 1/2	"	Gain
3	"	Glad
5	"	Gold
5 and 2 1/2	"	Given
7 1/2	"	Goal
10	"	Good
12 1/2	"	Guard
15	"	Grand
20	"	Grade
25	"	Geyser
30	"	Ginger
35	"	Gem
40	"	Genial
40 and 5	"	Gentle
40 and 10	"	Garter
40-10 and 5	"	Great
40-10 and 7 1/2	"	Giddy
40-10 and 10	"	Girdle
50	"	Glory
50 and 5	"	Glend
50 and 10	"	Glore
50-10 and 10	"	Gobble
60	"	Glove
60 and 5	"	Grip
60 and 10	"	Grotto



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